RAILROAD GAZETTE

FRIDAY, FEBRUARY 26.

Train Accidents in January.

The following accidents are included in our record for the month of January :

COLLISIONS.

REAR.

8th, a. m., freight on Louisville & Nashville ran into some cars broken loose from a preceding freight and stopped on a bridge near Wilhite, Ala. The force of the collision knocked down one span of the bridge and the whole train went down with it, wrecking locomotive and 28 cars, killing 2 trainmen and injuring 2 others.

8th, night, passenger train on Baltimore & Ohio ran over misplaced switch and into freight on a siding at Mark Centre, O., wrecking engine and several cars, injuring 2 trainmen very badly and 3 slightly.

9th, a. m., passenger train on Manhattan Elevated ran into rear of passenger train at Hanover Square station, New York, in a heavy snow-storm.

9th, night, freight on Wabash, St. Louis & Pacific ran into preceding freight near Oakley, Ill., wrecking engine and several cars.

10th, a. m., yard engine on New York, Lake Erie & Western ran into rear of freight near Port Jervis, N. Y., damaging several cars and injuring two trainmen.

10th, night, Chicago, St. Louis & Pittsburgh freight ran into Chicago, Milwaukee & St. Paul freight in Chicago, wrecking several cars and injuring two trainmen fatally.

11th, a. m., passenger train on Baltimore & Ohio ran into preceding passenger train stopped at Salt Works, Pa., wrecking 1 car and injuring 5 persons slightly.

12th, a. m., freight on New London Northern ran over a misplaced switch and into freight on siding in Norwich, Conn., damaging 6 cars.

14th, a. m., freight on Pennsylvania Railroad ran into preceding freight near Creighton, Pa., damaging engine and several cars. There was a dense fog at the time.

18th, night, freight on New York, Lake Erie & Western ran into preceding freight near Port Jervis, N. Y., damaging several cars.

19th, a. m., freight on Chicago & Northwestern ran over a misplaced switch and into freight on siding at Carroll, Ia., damaging several cars.

21st, a. m., passenger train on Manhattan Elevated ran into preceding passenger train at Sixty-seventh street, New York, damaging engine and 1 car.

24th, night, freight on Burlington & Missouri River ran into preceding freight stalled in a snow bank near Oberlin, Kan., wrecking a caboose and injuring 3 trainmen and a passenger.

25th, a. m., passenger train on Boston & Lowell ran into passenger train switching across the main track in the Boston yard. Engine and two passenger cars were badly damaged, and one trainman slightly hurt. It is said that the collision was caused by the failure to set signals properly to stop the switching train.

26th, a. m., work train on Chicago, Rock Island & Pacific ran into rear of passenger train stopped by damage to engine near Muscatine, Ia., wrecking a car, killing one trainman and injuring 3 others.

26th, night, freight on New York, Lake Erie & Western ran into preceding freight just going into a siding at Otisville, N. Y., damaging 4 cars.

27th, a. m., coal train on Erie & Wyoming Valley ran into preceding freight near Hawley, Pa., damaging engine and several cars. The track was slippery and the brakes failed to hold.

29th, very early, passenger train on Baltimore & Ohio ran into freight standing on main track at Chicago Junction, O. The engine, 10 freight cars and 2 baggage cars were piled up in a very bad wreck, killing 4 trainmen. The freight had been stopped by a blockade in the yard and had failed to send back proper signals.

29th, night, freight on Pittsburgh, Fort Wayne & Chicago ran over a misplaced switch and into freight on a siding near Lima, O., wrecking several cars and killing engineer.

30th, a. m., passenger train on Rome, Watertown & Ogdensburg ran over a misplaced switch and into freight on siding at Watertown Junction, N. Y., damaging several cars.

BUTTING.

5th, night, butting collision between two freights on St. Louis, Iron Mountain & Southern near Windsor, Mo., wrecked both engines and 8 cars. The accident was caused by a mistake in orders.

8th, night, butting collision between shifting engine and Wilmington & Northern passenger train running in Union Station in Wilmington, Del., wrecked engines and two cars. The cars caught fire and were destroyed. Taree trainmen were killed, three fatally hurt, five badly and three slightly hurt. A blinding snow-storm obscured the signals.

12th, a. m., butting collision between two freights on Baltimore & Ohio, near Coburg, Ind., wrecked 3 locomotives and 20 cars, killing 3 trainmen and injuring another fatally. The wreck caught fire and was burned up.

14th, p. m., butting collision between freight and passenger trains on Baltimore & Ohio, near Millville, Va., wrecked both engines and 7 cars and killed 3 trainmen.

22d, a. m., butting collision between two freights on Baltimore & Ohio near Layton, Pa., wrecked both engines and several cars and injured 3 trainmen slightly.

23d, a.m., butting collision between two freights on Philadelphia & Reading near Ringtown, Pa., wrecked both engines and several cars, killed 2 trainmen and injured 2 others. Cause, a dispatcher's mistake.

24th, p. m., butting collision between two freights on Grand Trunk near Toronto, Ont., wrecked 3 engines and 20 cars and injured a fireman.

25th, a. m., butting collision between two freights on Savannah, Florida & Western in Savannah, Ga., damaged both engines and injured a trainman.

25th, p. m., butting collision between passenger and freight trains on Northern & Northwestern near Newmarket, Ont., wrecked both engines, killed a trainman and injured 2 others.

31st, night, butting collision between two passenger trains on Atchison, Topeka & Santa Fe near Burlingame, Kan., damaged both engines.

CROSSING.

4th, a. m., Wabash, St. Louis & Pacific freight ran into Lake Shore & Michigan Southern freight at the crossing in Butler, Ind., wrecking several cars.

9th, p. m., freight on Cincinnati, Indianapolis, St. Louis & Chicago ran into Chicago & Eastern Illinois freight at the crossing at St. Anne, Ill., in a blinding snow-storm, wrecking 3 cars.

11th, early, passenger train on Indianapolis & St. Louis ran into Danville, Olney & Ohio River freight at the crossing in Kansas, Ill., wrecking a locomotive and injuring 2 trainmen.

14th, a. m., Jeffersonville, Madison & Indianapolis freight ran into Cincinnati, Indianapolis, St. Louis & Chicago passenger train at the crossing in Shelbyville, Ind., damaging locomotive and 1 car.

20th, a. m., Northern Central freight ran into New York, Lake Erie & Western freight at the crossing in Elmira, N. Y., doing some damage.

DERAILMENTS.

BROKEN RAIL.

6th, p. m., freight on Chicago, Milwaukee & St. Paul was derailed in La Crosse, Wis., by broken rail.

7th, a. m., 3 cars of passenger train on Central of New Jersey were derailed at Communipaw, N. J., by a broken rail.

12th, p. m., passenger train on Cincinnati Southern was derailed near Nicholasville, Ky., by broken rail.

20th, night, passenger train on Chicago, Burlington & Quincy was derailed near Albany, Mo., by broken rail, and 2 cars went down a high bank, killing a passenger and injuring 2 trainmen and 12 passengers.

23d, a. m., 7 cars of freight on New York, Lake Erie & Western were derailed in Batavia, N. Y., by broken rail.

30th, a. m., passenger train on New York Central & Hudson River struck a broken rail near Batavia, N. Y., and 2 cars were derailed.

BROKEN FROG.

11th, night, passenger train on Louisville & Nashville was derailed near Opdyke, Ill., by broken frog. A trainman and 4 passengers were slightly hurt.

14th, a. m., passenger train on New York & Long Branch was derailed by broken frog close to a bridge near Matawan, N. J. The train ran across the bridge on the ties, but none of the cars went off the bridge.

BROKEN BRIDGE.

4th, night, freight on Pennsylvania Railroad broke through a bridge near Duncannon, Pa., a pier having been washed out by a freshet. The engine and 8 cars went down. Three trainmen were drowned, 1 fatally and 5 severely injured.

SPREADING OF RAILS.

4th, night, freight on Chicago, St. Louis & Western was derailed in Joliet, Ill., by spreading of the rails. Two trainmen were hurt.

12th, p. m., passenger train on Boston & Lowell was derailed near Tilton, N. H., by spreading of the rails. The cars were badly damaged and 1 passenger hurt.

24th, midnight, freight on Ohio & Mississippi was derailed near Beardstown, Ill., by spreading of the rails, and a trainman was hurt.

26th, a. m., passenger train on Canada Atlantic was derailed near Coteau, Que., by spreading of the rails.

BROKEN WHEEL.

21st, a. m., engine of freight on Oregon Railway & Navigation Co. road was derailed at Wallula, Wash. Ter., by broken wheel.

BROKEN AXLE.

11th, night, freight on Central Vermont was derailed in St. Albans, Vt., by broken axle.

19th, night, 7 cars of coal train on New York, Lake Erie & Western were derailed in Elmira, N. Y., by broken axle.

30th, night, coal train on Philadelphia & Reading was derailed near Bound Brook, N. J., by broken axle.

BROKEN TRUCK.

19th, a. m., freight on St. Joseph & Grand Island was derailed near Hastings, Neb., by broken truck. Two trainmen and a passenger in the caboose were hurt.

CATTLE.

6th, a. m., freight on Montgomery & Eufaula was derailed near Spring Hill, Ala., by running over a horse.

15th, p. m., freight on Louisville, New Orleans & Texas ran over a cow near Yokena, Miss. The engine and several cars were derailed, killing engineer.

LAND-SLIDES AND WASH-OUTS.

4th, a. m., freight on Greenwood, Laurens & Spartanburg ran into a land-slide near South Tiger River, S. C., and engine and 2 cars were wrecked.

5th, a. m., passenger train on New York, Susquehanna & Western ran into wash-out at Midland Park, N. J., and the locomotive upset.

13th, a. m., freight on Pittsburgh, McKeesport & Youghiogheny ran into a land-slide near Scott Haven, Pa., and engine and several cars were piled up in a bad wreck, killing 2 trainmen and injuring 2 others.

SNOW.

Derailments from snow or in snow drifts were as follows :

5th, p. m., freight at Hardy, Neb., Burlington & Missouri River.

7th, night, passenger train, near Council Grove, Kan., Missouri Pacific.

9th, a. m., passenger train, Jersey City, N. J., Pennsylvania Railroad.

9th, a. m., passenger train near Gilmore, Neb., Union Pacific.

9th, a. m., freight in South Boston, Mass., Old Colony.

9th, p. m., passenger train near Whitehall, Pa., Baltimore & Ohio.

9th, night, passenger train at Raynham, Mass., Old Colony.

9th, night, passenger train in New Haven, Conn., New York, New Haven & Hartford.

11th, early, passenger train near Leetsdale, Pa., Pittsburgh, Fort Wayne & Chicago.

11th, night, freight near Roanoke, Ill., Chicago, St. Louis & Western. Engineer killed and fireman hurt.

12th, night, freight near Clymer, Pa., Buffalo, New York & Philadelphia.

13th, early, passenger train near Corry, Pa., Buffalo, New York & Philadelphia.

21st, a. m., passenger train near Crete, Ill., Chicago & Eastern Illinois.

21st, a. m., freight near Michigan City, Ind., Michigan Central.

22d, a. m., freight near Cheney, Neb., Burlington & Missouri River.

22d, night, freight near Staplehurst, Neb., Burlington & Missouri River.

22d, night, freight near Grand Island, Neb., Union Pacific.

23d, a. m., freight near Forreston, Ill., Chicago & Iowa.

MISPLACED SWITCH.

2d, a. m., freight on Pittsburgh & Lake Erie was derailed in Youngstown, O., by misplaced switch.

8th, a. m., freight on Chicago, Milwaukee & St. Paul was derailed in La Crosse, Wis., by misplaced switch.

9th, very early, passenger train on St. Louis, Iron Mountain & Southern was derailed near Poplar Bluff, Mo., by misplaced switch. The engineer was hurt.

19th, night, freight on New York, Lake Erie & Western was derailed near Lackawaxen, Pa., by misplaced switch.

20th, night, freight on Union Pacific was derailed near Lansing, Kan., by misplaced switch. The engine upset, killing the fireman.

21st, noon, coal train on Philadelphia & Reading was derailed at Gordon Plain, Pa., by misplaced switch.

21st, p. m., freight on New York Central & Hudson River was derailed in Rochester, N. Y., by misplaced switch.

RAIL REMOVED FOR REPAIRS.

5th, night, freight on Chesapeake & Ohio was derailed at Stretcher's Neck Tunnel, W. Va., where some section hands had taken up a rail for repairs without putting out the proper signal. Three section hands at work in the tunnel were caught by the derailed cars and killed.

MALICIOUSLY CAUSED.

25th, night, passenger train on Illinois Central was derailed by obstructions on a bridge near Abbeville, Miss., locomotive and 2 cars falling into Tallahatchie River. The engineer was killed and 5 passengers slightly hurt.

UNEXPLAINED.

11th, p. m., construction train on Texas & St. Louis was derailed near Powell, Tex., and the cars were piled up in a bad wreck. Three trainmen were killed and 2 others badly hurt.

20th, a. m., freight on New York, Lake Erie & Western was derailed near Riverside, N. J., wrecking 5 cars.

25th, a. m., freight on Elmira, Cortland & Northern was derailed near Horseheads, N. Y., and 8 cars were wrecked.

29th, night, passenger train on Wilmington & Weldon was derailed near Goldsboro, N. C., doing some damage.

OTHER ACCIDENTS.

BOILER EXPLOSIONS.

3d, very early, tube of water grate in locomotive of freight on Central of New Jersey exploded when near Centreville, N. J., throwing fire and steam out of fire-box door. A brakeman was thrown from the first car and killed, and another was badly scalded.

22d, night, freight locomotive on Chicago, Milwaukee & St. Paul exploded its boiler while standing in the round-house in Madison, Wis., waiting to go out with a train. The engine was completely destroyed and the round-house was wrecked, five other engines being damaged by the falling roof. A wiper was killed, 4 wipers and 5 firemen hurt.

BROKEN PARALLEL ROD.

9th, a m., locomotive of passenger train on Manhattan Elevated broke a parallel rod near Houston street station, New York.

MISCELLANEOUS.

13th, noon, as freight on East Tennessee, Virginia & Georgia was running through a tunnel near Chattanooga, Tenn., a locomotive loaded on a flat car struck the top of the tunnel and knocked down several of the timbers. The tunnel caved in, crushing 1 car and breaking the train in two.

21st, very early, sleeping car on passenger train on Galveston, Harrisburg & San Antonio caught fire when near Sierra Blanco, Tex., and was destroyed.

SUMMARY.

This is a total of 94 accidents, in which 41 persons were killed and 90 injured. As compared with January of last year, there was a decrease of 51 accidents, an increase of 16 killed and a decrease of 92 injured.

A fuller statement of the totals and averages, with a summary of the causes of accident, will be found on another page.

The Master Car-Builders' Club.

The subject of "Car Paints and Painting and Car Repairs by Contract" was discussed at the regular monthly meeting of the Club, held at No. 113 Liberty street, New York, Feb. 18. Mr. Leander Garey, the President of the Club, occupied the chair.

Mr. A. D. KEYS: The purer the paint the better the results obtained.

Mr. JOHN E. ELMENDORF: The priming coat is most important. The wood must be protected so that it will not absorb moisture, and the body then worked up to the finishing coat of varnish. All other coats are merely for ornament. The great difficulty in painting is the dryer. Pure pigment should be mixed with pure linseed oil. Good old settled raw linseed oil gives the best results. All patent oils and mixtures are a positive injury to good pigments.

Dryers are really the ingredients that undergo a change after the paint has been laid. Being mostly composed of volatile oils, they evaporate and leave linseed oil. Paint laid with these dryers may appear to be all right when it is fresh, but soon dims and flakes off, when the manufacturers are blamed, though it may not be their fault. With certain materials the dryer eats up the oil, and flakes of paint become brittle and crumble and afterward peel from the surface. The oil has been decomposed and possibly volatilized by the dryer, and there is nothing left but the powder of the original pigment held in place by the varnish.

Another great reason for paint giving way is that the primer, the filler, the rough stuff and the color are bought of different manufacturers who use different methods. When these materials are put together they begin to fight and consequently the paint gives way. Lead and quicksilver cannot go together; nor can oxide of manganese and sulphate of zinc, neither will red lead, sugar of lead and manganese or the sulphate of zinc work together. A dryer which will not eat the paint is needed. Give the work a good coat of raw linseed oil and leave it to dry itself, and when that is dry then put the paint on top of that; do not use too much dryer, and always use the same. Painters expect to buy material for less than it can possibly be sold, and ask for Tuscan red at 20 cents per lb., while the genuine article cannot be bought for less than 50 cents. When cheaper it is toned up with fugitive colors and soon fades, and cannot be matched. If pure material were used, there would be no change, and a panel broken could be replaced and painted to match the rest of the car.

President GAREY: What would be the result if railroad companies were to have their cars painted by contract by some first-class manufacturer of paints who should paint the cars at a given price per car and keep the stock of the line in first-class presentable condition?

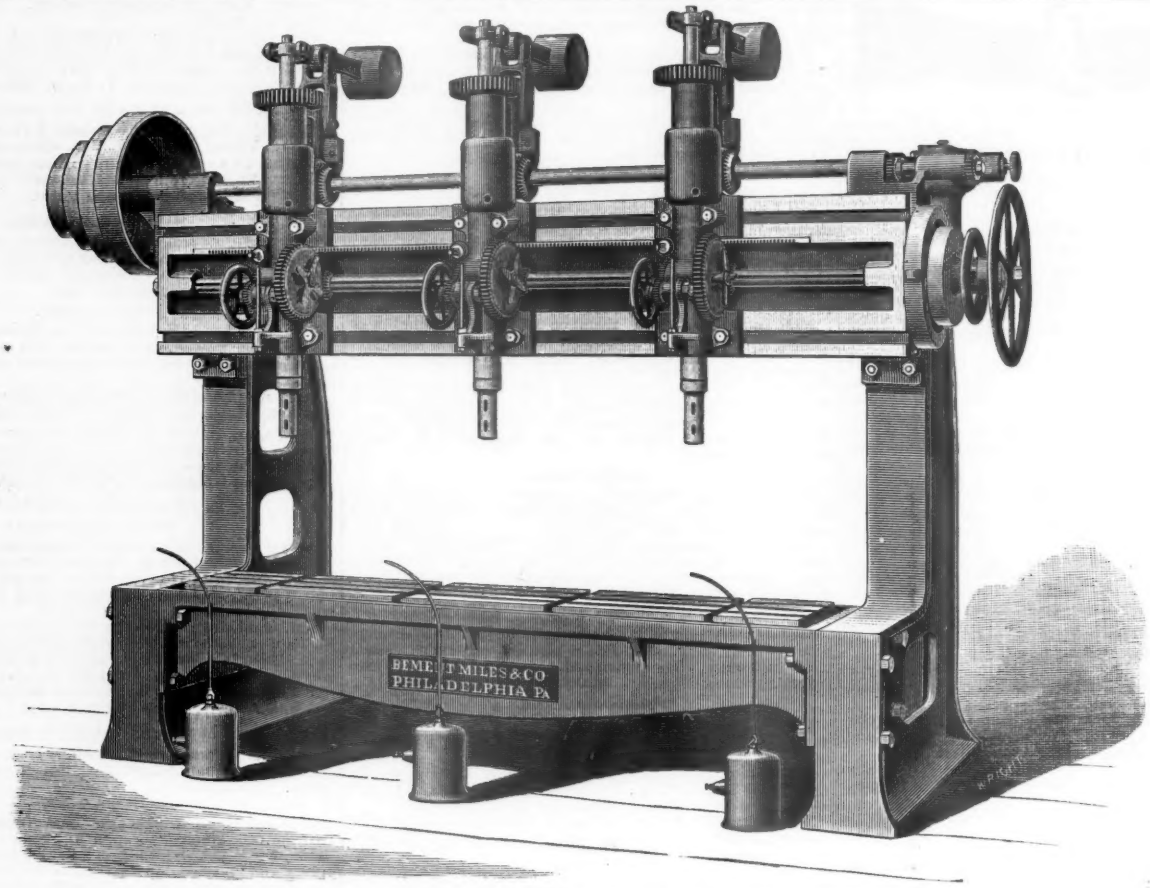
Mr. ELMENDORF: The lowest bidder would get the cars, the lowest bidder would furnish the material, and the workmen, too, would correspond with the price.

President GAREY: But if a responsible firm undertook to keep the stock in good condition for a term of years what quality of material would they use? If they put on an inferior article it would cost them more in the end, while a good article would last longer.

Mr. ELMENDORF: It would be difficult to do repair work by contract, though new work might be done.

President GAREY: The railroad company would have the shops and furnish the cars, and a schedule could be made to cover all the points.

Mr. KEYS: The old idea was that nothing but linseed oil should be used in priming. A certain percentage of linseed



MULTIPLE DRILLING MACHINE FOR LOCOMOTIVE WORK.

Built by BEMENT, MILES & Co., *Philadelphia.*

oil with a certain percentage of gum produces better results than linseed oil alone, and saves time.

Mr. C. A. SMITH: Should all panels have glue burlaps on the back to keep the dampness from the paint?

Mr. ELMENDORF: I rode recently in a coach that had only been out for one month, yet for five feet on each end of the car where the stoves were placed the paint upon the outside had been badly blistered. The inside panels would absorb moisture, and this when thrown out would be taken up by the outside panels, showing that the inside of the panels should be painted as well as the outside.

Paper board panels can be made under pressure with mucilage. They will take linseed oil and last as long as any wooden panel, as there is no grain and no chance to crack. They cannot absorb moisture because they are filled with a flux, and the paper on the inside has a waterproof coating.

The durability of a car finished in varnished mahogany, outside, not painted, would depend greatly upon the pores of the wood being well filled up before the varnish was put on. The car would require revarnishing rather oftener than if painted.

Mr. GAREY believed that cars could be painted and repaired more cheaply by contract than by the present system.

Mr. CAMPBELL also thought so.

Mr. H. A. WEBSTER: A railroad can buy materials as cheaply as a contractor and get as good men. The condition of the cars at the end of a long contract would probably be bad. The system of buying the cheapest materials from different makers makes it difficult to fix responsibility for failure.

Mr. GAREY: The manner in which the materials are bought precludes the doing of the work in the most economical manner.

Mr. ELMENDORF: Would it not be easier to induce the directors who govern the purchasing agent to buy good materials and put it in the hands of their painters, than to give it out by contract?

Mr. LEIGHTON: The pressure to reduce expenses and keep up dividends is felt throughout the staff of a railroad from the president to the painter who thins his paint with turpentine to make it work easily.

MR. J. M. WADE: The system of painting by contract is very well for two or three years perhaps, but a new Board of Managers may come in anxious to make the best showing and run the road cheaply. They are honest in their intentions of having everything done in the best possible manner, but want the expenses cut down. Suppose I take a contract at a price which enables me to purchase the best material, and do first-class work. When these changes occur I am requested to cut down my price, as somebody else can do it for less. I must either use cheaper materials to keep the contract or give the work up.

In Canada cars are subjected to extremes of temperature, a most severe test for the paint. Both varnishes and paints must be elastic to endure these great changes. If the paint is hard and brittle and the varnish elastic something must give way. A compound of equal parts of an elastic and a hard drying varnish gives good results. Thoroughly fill the pores and remove all appearance of the grain of the wood in a hard wood panel, then coat with cement, and upon that lay a veneer of metal, composed of lead foil and a certain amount of zinc to give it hardness. This gives very satisfactory results. The metallic covering on the wood renders it non-absorbent, and it will last as long without repainting as the iron medallions on Pullman cars. It is necessary to have coats of lead between the priming coat and the paint, in order to resist the natural absorbing qualities of the wood. To thoroughly seal the pores of the wood there should be an affinity between the several coats employed. The paints and varnishes should be such that there would be an adhesiveness, making them practically a part of the wood itself. If there is no affinity the elements are conflicting, and the result is a flaking off or cracking. The fewer coats employed the better. A priming coat that will seal the pores of the wood, is preferable to the coat that contains pigment and does not achieve that object. In England they do not burn the paint off the cars, because they pay particular attention to getting up the body, and do not depend on the varnish for lasting effect. They put on a coat; let it stand a while; then put on another, and let that stand. Very large shops are wanted to hold the cars while in process. I am a firm believer in a happy medium between the two extremes.

Mr. ELMENDORF: A single coat is sufficient to seal the pores. If when dry it proves insufficient, another coat can be put on.

Mr. WADE then explained a new style of decoration for panels for internal use in decorating cars. It has been indorsed by some of the oldest railroad car builders and adopted by some of the leading railways in the country. The process, by a combination of chemical and mechanical methods, produces fac-similes of inlaid wood at a nominal cost. Being impervious to moisture and heat, it has an advantage over the real inlaid woods, and stood the great heat and moisture at New Orleans when the real veneer peeled off. The work is done on three-ply wood on account of its convenience and being less liable to crack or check. The method of ordering is to send in a diagram giving sizes of the panels required, and showing the lines of the car. We send the pieces all ready to put in position. Thirty railroad companies in this country are using this work in their cars.

The meeting then adjourned.

Multiple Drill for Locomotive Work.

There is scarcely any metal working appliance which has received, during the past 35 years, a more varied and rapid development than the drilling machine. Yet it is probably the very oldest machine tool in the world. The earliest turning lathe was nothing but an application of the ancient bow-drill, in which the motive power was a bow, whose string, having a turn round the drill shank, caused it to revolve when the bow was moved to and fro by hand or power. Yet within the memory of middle-aged mechanics the drill-press, as it used to be called, was still an ugly, clumsy, inconvenient affair, frequently thought unworthy of a frame or pedestal of its own, and bolted ignominiously against a wall or a post. The memory alone of that old horizontal handwheel on the spindle, that, with a long pull and a strong pull, forced the drill downward into cut, or slowly raised it—innocent of any counterweighing—is enough to make many an arm that has not yet lost its pith ache with a commemorative pang! What a contrast to the modern first-class Upright Drill, with its dandy column, automatic feed, quick return, counterweight, etc., etc.! Then again we have had a still further evolution comprising Radial Drills of wondrous refinement and convenience, as well as universality of function. The exigencies of the manufacture of fire-arms, sewing machines, etc., next called for the use of several spindles combined in one machine for the operator's convenience, and so first arose multiple drills. These also have had a regular progress, and have been made in many different ways. Our illustration represents one of the latest, by Bement, Miles & Co., of Philadelphia, a simple form adopted mainly to locomotive work. Its construction is as follows:

The crosshead is supported at a fixed height upon two uprights, whose bases are curved forward to receive the ends of the table casting, which is securely bolted between them in exact parallel relation to the crosshead. This forms a rigid structure without excessive weight. The usual distance between the uprights is about 5⅛ to 6 ft., but this may be increased or diminished as desired. Upon the crosshead are placed three or more movable drilling heads. Each one is separately adjustable upon the crosshead by rack and pinion at any required distance from another not less than the minimum of 12 in., which is required for the proper clearance of the working parts. The spindles have 12 in. vertical traverse. They can be so arranged that any one of them may be stopped while the others continue in motion; or all the spindles may be handled simultaneously; or any of them can be disconnected and moved vertically by hand, while the others continue at work. Each head is provided with its own separate water pot, counterweight, automatic feed and quick return connections, a pinion working into a rack on the crosshead for convenient lateral adjustment, and 4 bolts engaging in T-slots on the crosshead, by which it can be securely held in any desired position.

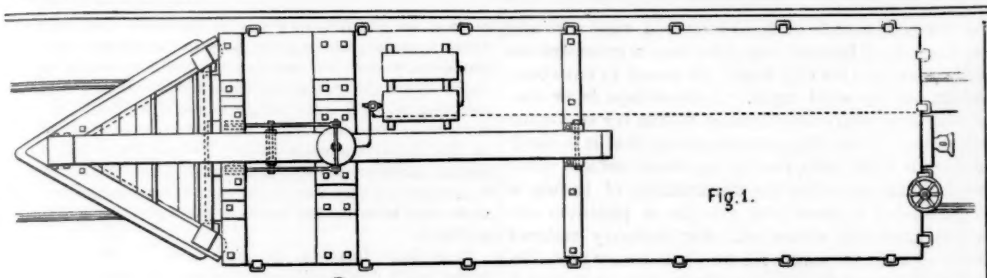
The driving works are fitted with three changes of speed. The power given is that requisite for drilling three holes of 1½ in. diameter each, at the same time, when three spindles only are used; or, four holes of 1¼ in. diameter each when four spindles are employed.

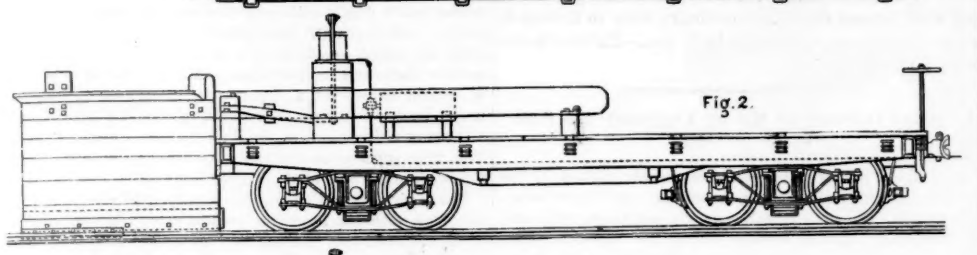
It has been found by experience that, for the work this machine is intended to do, no adjustment of the table is required in any direction. Like the crosshead, therefore, the table is securely fastened in a fixed position. The result is a machine of great rigidity and of very simple construction. The work to be drilled is secured upon the upper surface of the table, which is slotted for bolts. The height of the crosshead above the table is such that the ordinary length of the drills and the traverse of the spindles give just the clearances that are found most convenient to facilitate the quick and accurate drilling of such pieces as are usually drilled, in these machines, for locomotives. For other work, the crossheads are sometimes made to raise and lower, and the tables to traverse in all directions by hand or power. In fact, an almost infinite variety of adaptations can be made of this latest development of the primitive drilling apparatus, some of which varieties we may be able to bring to our readers' notice in the near future.

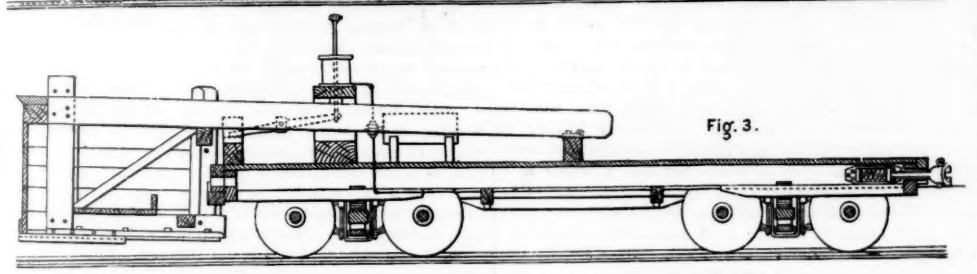
Pneumatic Snow Plow and Track Flanger.

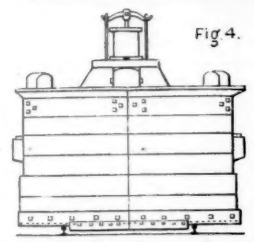
We illustrate herewith a machine used on the Michigan Central and other roads for cleaning snow from railroad tracks. While not designed to take the place of large snow plows used to clear the track of heavy drifts, still it has sufficient plowing powers to go through drifts of five to six feet in depth and any length. It is just the plow needed by roads lying south of the usual snow belt, but which have occasional snow storms. As a track flanger or track clearer it recommends itself to all roads having hard wheeling in winter. It will be observed that the plow and flanger consist of attachments to an ordinary flat car, easily put on in the fall and as easily removed in the spring. The peculiar parts of the machine consist first, of the flanging knife which is so shaped as to clear away the snow and ice down to the ballast, and secondly, of the pneumatic arrangement which places the rising and lowering of the plow entirely in the control of the locomotive engineer.

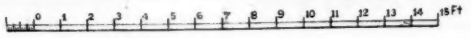
As will be seen by referring to the engravings, the whole plow can be lifted clear of the track by means of a vertical











PNEUMATIC SNOW PLOW AND TRACK FLANGER, MICHIGAN CENTRAL RAILROAD.

air-brake cylinder piston and cross-head. This cylinder is connected by means of the usual brake pipes and hose to the engine and can therefore be operated by the engineer.

The plow is usually run ahead of a locomotive and raised at road crossings, switches, etc. No men are required to operate it other than the regular train crew on the locomotive. It can be run at any speed, but it is usually run slowly while clearing sidings, for which purpose it is nearly as valuable as for main track use.

This plow will between daylight and dark clear the main tracks and sidings of an ordinary division of 100 miles, thus doing an amount of work that a thousand men could not do in so satisfactory a manner. The machine is the invention of Mr. Asa G. Dailey, of Detroit, Michigan.

The Telegraph as Applied to Train Movement.*

[From a forthcoming work by J. J. Turner, Superintendent, First, Third and Fifth Divisions, Chicago, St. Louis & Pittsburgh Railroad.]

VI.

"This brings us to the discussion of a new theory of train movement. The experience I have had justifies the assertion that upon a single-track railroad having a large traffic, its capacity can be increased from 25 to 40 per cent., its train movement simplified and expedited, and a largely increased mileage produced from its motive power, with a reduction of the expenses in the wear and tear of equipment and consumption of fuel entailed by the frequent and unnecessary stoppages of trains, and in addition thereto the safety factor largely increased.

"Let us assume a blocked section of single-track railroad 25 miles in length after the following method: The passing side-tracks are five miles apart and arranged on either side of the main track and joining the main track in front of a signal tower or station, the double-track rule 'keep to the right' is to apply in the use of these sidings. The leads or junctions of the sidings with the main track should overlap, that is, run by each other, so that trains from both tracks can discharge into the main track simultaneously. It has the effect of making a long stretch of double track, and I hope to be able to demonstrate the possibility of passing one or more trains, in opposite directions, without stopping, a description of one of these stations will serve for all.

"We have first a signal station with the usual block signals, east and west-bound passing sidings—say 2,500 ft. each in length—the four switches of the passing sidings to be operated by the operator in the signal station by the electro-hydro-pneumatic process, a recent invention by which switches can be set at any distance from the point where the power is applied. This station may be a crooked piece of line, and the switches at the opposite ends of the sidings not in the vision of the operator. Hence that he may know, first, the position of the switches at every movement back and forth, the switches will telegraph him their position; and second, to prevent him from throwing the switch under a moving train, the train itself by action of a track circuit will lock the switch in the position it is in when the first contact of the train closes the circuit, and keep it locked until the train has cleared the switch.

"The procedure will then be as follows: In the block section there will be five blocks averaging five miles each in length. At one of the termini will be located the dispatcher with his cribbage-board arrangement, heretofore described, in front of him, and a list of each day's trains arranged in sequence of time. Then follows the same theory of movement as in use around the 'Falls Cities,' viz.: trainmen run absolutely by the colors and regard nothing else. Priority in rights of trains of a superior over an inferior class, and all questions connected with the movements, rest absolutely in the hands of the train dispatcher.

"A train approaching a signal station from either direction when one mile distant will announce itself by closing a circuit and setting an indicator. Upon this the operator will report to the train dispatcher 'train from east.' If the train from the west is to be passed, the dispatcher will respond 'side track,' and the operator will signify his understanding by repeating the same word, and will set the switch leading into the passing track.

"The setting of the switch will set a cautionary signal in front of the coming train, that they may understand that they are to take siding, and reduce speed that they may enter in safety. Simultaneously with the approach of this train from the east, two or more trains from the west may announce themselves, and the same formula will be repeated. By all trains run through the siding you have what is equal to 5,000 ft. of double track, and you can readily see that frequently trains can pass each other without stopping. The train dispatcher has better control of his trains than at present. If a sudden emergency arises, and it is desired to get a train out from one of the termini quickly, the longest delay that can occur will be the time that it requires for a train to run the distance (say five miles) from the last block station to that terminus, not to exceed 20 minutes. In the meantime he can put all his other trains away on side-tracks; at any hour of the day, having 25 minutes' notice; he can give an absolutely clear track from one end of the block station to the other.

"To place the matter more fully in the hands of the man who does the thinking for all these train-runners, and to protect him against the possible mistakes of his operators, in displaying the wrong signal, it is proposed to lock the main clearing signals at danger, by electricity, under the control of the dispatcher, so that an operator cannot clear a train even when instructed to do so, until the train dispatcher opens the circuit that locks the signal. What advantages follow this? First, the elimination of the danger of accident connected with the present system. The factors that produce disaster in the handling of train-orders have been discussed. They are the dispatcher, the operator, the conductor and the engineer; either one of these four can produce an accident. By eliminating any or more of these factor you make the responsibility concrete, for an individual responsibility fills its office better than a divided one. This logic may be attacked, but it is based on experience.

"How many of you have known of accidents where a conductor in doubt as to a point sits in his caboose and depends upon "Jim" in the engine to understand it? Jim is befogged on the same question, but depends on "Bill" in the caboose, and the result of this division of responsibility is disaster.

"I have tried to show that under the theory discussed the thinking is all done by one man, the responsibiiity all rests upon one man, and he has under his absolute control all the appliances for carrying out the system and has only in a small degree to depend upon the intelligence and assistance of the operators and trainmen.

"The next proposition is the economies accomplished by saving of delays to trains. Upon this 25 miles of track we will assume that 100 trains pass daily; it is not an extravagant calculation to assume that 100 orders are issued, daily. A delay of four minutes to the manipulation of each order is equal to 400 minutes, or 6 hours and 40 minutes per day. In this time a train moving at the rate of 20 miles per hour will travel 133⅓ miles. Multiply this by 365 days, and it produces 47,650 train miles, which is certainly an addition to efficient motive power capacity.

"The third proposition is the economies that can be subserved by saving a large percentage of stoppages to trains. In every instance where a train of any class takes the siding it requires in effect four stoppages—one to let the brakeman off to throw the switch, another to pick him up before proceeding to opposite end of siding, then stop and wait until the expected train has passed, and then again to pick up the man that sets the switch back to the main track after the train has passed out. I have the authority of a railroad manager of large experience and originality, whose name I am not authorized to use, that the cost of starting and stopping a train is 18 cents. The question is metaphysical and difficult to get at, but this sul t is not reached by guess-work, as all the elements that enter it are carefully considered, and his conclusions are doubtless the very highest authority on this vexed question.

"By the use of the hydro-pneumatic switches and their electrical adjuncts, as heretofore discussed, three of the stops necessary to the side-tracking of a train are obviated, yielding a saving of time and a natural saving of money; how much money it would be impossible to say, but it would represent one of the material economies that cannot be produced in figures, but are continuously working in an unseen but potent way to a great end—the cheapening of railway transportation.

"Permit me to say that this system is intended to become an adjunct to the present one of running trains by time schedule rules. All rules governing train movement will be kept in effect as at present for the purpose of supplementing the failure of any telegraph lines, signal or other features of this process, while such failure could only be temporary, notice to be given to each train arriving at any of the offices after the following form: 'Telegraph line not working; run as per time-card' will give trains all the rights they have now. A word as to the cost of establishing one of these stations: In the matter of sidings, it is not likely that any additions would be necessary; simply the taking up in one place and laying down in another. This expense would be covered by local considerations and cannot be estimated. The cost of the station, main signal and other appliances will approximate $4,000.

"Vexing questions will arise in discussing this theory, among the first of which will be, What will you do with local freight trains doing work at stations in the blocks? The answer is simple: If there is not enough siding room at the station to permit the way freight to clear the main track while doing its work, then the crew must protect its train as long as they occupy the main track, unless arranged by special order. No train will be permitted to enter the block approaching the local freight, and trains following will enter under a green signal. The benefits to be derived in the carrying out of these ideas are amply sufficient to justify the expense of laying down sufficient track at stations, mines, manufactories, etc., where much switching is to be done to enable trains to clear the main line while doing such work.

"Upon the same theory the telegraph wire used for train service, setting signals, etc., should be an aerial cable of kerite or some cheap form of insulation that will reduce failure of the wires from fouling, lightning and other causes, to a minimum.

"I am doubtful if I have made myself fully understood. The ground to be covered was greater than was anticipated, and the infinite details of the theory that should have been presented have been left out, relying on your intuition and technical knowledge of the subject to supply the deficiency. I disclaim any idea of emulating the youth who fired the Ephesian dome, but simply write my experience and suggest its applicability to a wider field. If the suggestion contains a germ that in your hands may be made to produce something for the common good, my labor will have been repaid."

CHAPTER XXIV.—*The general plan of issuing orders in the Pittsburgh, Cincinnati & St. Louis lines.*

As an illustration of the manner in which all the principles mentioned in Chapter III can be complied with, there is given here a description of the plan in use on the Pittsburgh Cincinnati & St. Louis Railroad, and lines under the same management. This system is chosen because of the writer's greater familiarity with its details.

Primarily, the time-card gives the regular trains, with the days upon which they are to run. No variation is made from this card without special telegraphic orders.

The road is divided into sections from 30 to 120 miles in length, varying with the number of trains to be moved. Each of these sections is controlled by three dispatchers, who work eight and rest 16 hours each, one or the other of them being on duty at all times.

They act for the Superintendent, and in his name; they are authorized to make any change in meeting points, or the general programme of progress, as they consider the interest of the traffic demands.

Their means of communicating their desires to men in charge of trains are through orders, the duplicate system being used.

In order that they may have an accurate record of the position of every train on the road, telegraph offices report to them the time each one passes; this report is recorded in their office.

Persons in charge of terminal stations send them statements of the number of trains, cars, the engine numbers and conductors' names, which will be forwarded on schedule numbers, together with the time each will probably be ready to start.

For the purpose of identification, orders are numbered consecutively, commencing with No. 1 each week. That men receiving orders may certainly understand them forms are provided for the most frequently occurring movements. These forms are adhered to whenever they will accomplish the desired result; when they will not, the dispatcher uses his own language.

To prevent long and confusing directions, a rule is made that, so far as possible, each order will contain no more than two trains and one specified movement.

At the different telegraph stations reliable operators are placed, to whom orders are sent, and who acknowledge the receipt of each, giving its number and the number of the train to which it is addressed.

To insure the stoppage of the train, fixed train-order signals are provided, which automatically take the position indicating orders, unless held otherwise by the operator.

To guard against a lamp blowing out and letting a train by after night, a rule is made that, in the absence of any signal where one is usually displayed, the train must be brought to a stand-still and the cause ascertained. The stoppage of the train is thus assured, save for the one possibility of an operator mistaking a train for which he has orders for another for which he has none, and giving it a "clear" signal.

Orders are copied on manifold paper, so that at one writing and while the words are transmitted over the wire, all the copies can be made. After all the operators have acknowledged the receipt of the order, they each repeat it to the dispatcher, from address to signature, in the identical language that it is sent. If the copies be correctly made, the dispatcher indicates it by saying "O K;" but, if not correct,

* (*Copyright*, 1885, *by J. J. Turner.*)

new copies must be made and repeated; alterations and interlineations may be confusing, and are, therefore, not admitted. The order is then ready for delivery to trainmen, who are required to receipt for it, and their receipt is sent to the dispatcher, who, if he still wants the order used, responds to the signature by the word "Correct," giving the time.

In addition to train number, the engine number is mentioned in each case, that the trainmen may have additional means of identifying the train.

Each of the steps from the sending to delivery is recorded on a book in the dispatcher's office, called the "order book."

Comparing this plan with the twelve principles, we see that they are complied with, as follows:

The First. By a rule to that effect.

The Second. By reports from telegraph stations and persons in charge of terminals.

The Third. By the adoption of forms which become familiar, and are used whenever practicable, and by prohibiting erasures or alterations.

The Fourth. By the acknowledgment of the operator, who gives his own initials and his office call.

The Fifth. By a fixed signal, which will stop all trains unless intelligently manipulated.

The Sixth. By the receiving operator repeating the completed order to the dispatcher for verification.

The Seventh. By the use of the duplicate syscem.

The Eighth. By sending to both trains at the same time.

The Ninth. By requiring the signatures of the conductors and engineers before delivery to them.

The Tenth. By the response "Correct," inscribed on the order after the signatures have been sent to the dispatcher.

The Eleventh. By giving the number of the engine on every train mentioned in an order.

The Twelfth. By the use of an order book in the dispatcher's office, in which all orders are written, and upon which each subsequent step is recorded.

[THE END.]

Contributions.

Iron Tanks and Steel Boilers.

CLEVELAND, O., Feb. 19, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

My attention has been called to the report of proceedings of the New England Railroad Club, Jan. 13, published in the *Railroad Gazette* of Jan. 22. I am there reported as using best quality of charcoal No. 1 iron for boiler work. The subject under discussion was "the material for locomotive tanks," and the use of best quality of charcoal No. 1 iron applied to that class of work. This company was one of the pioneers in the use of steel in boiler construction, and have never had any reason to regret the choice.

GEORGE W. STEVENS,
Superintendent Motive Power,
Lake Shore & Michigan Southern Railway.

The Proper Lead for Turn-outs.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The standard switch plans of the Pennsylvania Railroad, given in your issue of Dec. 4 last, are interesting so far as they go, but there is one matter of detail, among others, which seems to have been omitted.

I refer to the radius of curve between the switch point and frog.

From an inspection of some of the standard switches of the Pennsylvania Railroad, I infer that the curves are generally compounded, the sharpest point being near the frog.

This seems to be the result of making the lead, or frog distance, too long and forcing the curve to fit.

If the lead in a 1 in. 10 switch were shortened from 95 ft. to say 80 or 82 ft., the curve would fit the tangents, and a small piece of straight could be put in next to the frog. This would allow the car trucks to become straightened up before passing through the frog, which I think is a matter of some consequence.

At the same time the switch being made shorter, the cost would be reduced. INQUIRER.

Chains.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Can you or any of your numerous readers advise me of a suitable substitute for the 100-foot steel chain on railroad surveys. I am now using a chain (made by a well-known firm of New York city) which has been in use only six months, and which I found by a recent test to be five-tenth of a foot too long.

Being unable to take up this extra length at the handles on account of the insufficient length of screw threads usually provided for the purpose, I was for a time at a loss how to remedy the trouble, but finally took out of the chain one or more of the small oval links between the 10-ft. tags until the chain was reduced to the standard length. I was at first afraid that I would experience some difficulty on account of the chain *kinking*, but found that it worked as well with one small link between the longer ones as with two.

Why cannot some of our instrument-makers take advantage of this fact by omitting the extra link, and thus reducing the bearing surfaces in a 100-ft. chain from 600 to 400, or ⅓ less; or better still, as this is an age of advancement and improvement, why cannot some enterprising man invent a substitute for the chain, than which I can consider nothing more unreliable, unless it be a clothes line. C. HAIN.

[A chain called the Grummond chain (if we remember correctly), made of light tempered steel wire and no rings at all between the links, was in extensive use some years ago for city work, but seems to have been driven out by steel tapes. A brass tape is, or was, almost universally used around Boston for surveying purposes. It has the great advantage that it is rarely broken, a kink being readily smoothed out and never breaking the tape, but the disadvantage of having to be graduated by hand with chloride of platinum ink, which gradually wears off. For ordinary railroad work no good substitute for the chain seems probable, and with brazed links and ordinary care in testing it need never be so much as an inch out.—EDITOR RAILROAD GAZETTE.]

American Institute of Mining Engineers—the Pittsburgh Meeting.

Although Pittsburgh has been frequently visited by the various scientific bodies, yet its far-farmed and lavish hospitality always brings to its gatherings a large and enthusiastic assembly. It was evident from the commencement that this meeting of the Mining Institute would be no exception to the rule, and arrangements were accordingly made for the reception of a large number, nor were the anticipations of our friendly hosts disappointed. It is believed to have been in point of numbers the greatest assembly of the Institute. Nor was it lacking in character; many of the oldest and most distinguished members were present, some of whom had not appeared at a meeting for years. Accordingly every one was happy, and the session opened most auspiciously in the chapel of the First Presbyterian Church, a place most admirably adapted for the purpose, being commodious and well lighted, besides being constructed on proper acoustic principles.

Mr. John W. Chalfant delivered the address of welcome, predicting that the present meeting would prove to be as full of interest as any previous one, and the result showed Mr. Chalfant to be a true prophet.

The presidential address was then delivered by Mr. Bayles on the subject of "Ethics of Engineering Practice." The great point of this admirable speech was the plea for a high standard of professional honor, the orator contending that thus alone could the profession of engineering be elevated to the justly high standard its practice called for. He held, and with great force, that no engineer could receive with a clear conscience a so-called commission from the owner of any article recommended by the engineer to those employing. He remarked that he particularly addressed the younger members, but this left the rest of us in a state of most dire uncertainty as to whether he considered them more impressible, or whether he judged the older ones so "dyed in iniquity" that an appeal to them would be hopeless. Being, however, by nature an optimist, the writer unhesitatingly accepts the former view, and it may be here remarked that there is no profession where larger interests are committed to the hands of individuals, or where there are greater opportunities for unfair practice, and yet it is with pride that we can point to the universal fact there are few rich engineers as a complete answer to any charge of making money unfairly in this laborious but fascinating profession. The address was well received, as its subject and the character of the speaker deserved, and the tall form of the worthy President as he stood between the ten commandents which form the background or rear wall of the chapel, would have impressed us with the belief that he was another Moses about to make a new exodus from the flesh pots of Egypt, but for the fact that Moses never wore a dress suit and had beside a flowing beard. After the merited applause had subsided, Mr. Shinn read a most interesting paper on the progress of Pittsburgh in the last seven years. It seemed almost past belief, and yet many present had been able in their own experience to verify all that the speaker stated.

The genial and witty Mr. Wm. Metcalf followed in a bright speech on the subject of Natural Gas and its Resources. According to the speaker, this illuminator was found in China 1,800 years ago, and as to its extent, the speaker simply deducted the shell of the earth five miles in thickness from the cubical contents, and gravely declared the balance to be ALL natural gas; and from its extent, as we afterwards saw, we were almost inclined to believe that our speaker had not gone *far* beyond bounds. Behind Mr. Metcalf, as he spoke, Prof. A. Y. Lee made sketches illustrative of the speaker's remarks. These were rapidly drawn on a black-board with colored crayons, and were certainly remarkable for brilliancy and rapidity of execution. They received frequent applause, and at the conclusion of Mr. Metcalf's speech, Mr. Lee drew a little on his own account. He depicted a man running, in a few lines, and then with a sweep of his hand and a single stroke *evoluted* the man into a woman with a chignon (or something like it), and the present style of—well, it *is* the style, but, however, it goes *behind* the woman. Mr. Lee performed this evolution in a manner which would have caused a Darwinian to die with envy.

Dr. Raymond then read a biographical sketch of the late Oswald J. Heinrich, one of the members, who was so modest and unassuming that many scarcely knew him, and but few knew his history. The sketch was worthy of the subject, being feeling and timely, and embodied the history of a checkered though noble existence, and showed a life devoted to heroic though useless efforts in the cause of freedom in Europe, and to scientific research and developments in this country. At certain stages Dr. Raymond's remarks were pathetic, and he depicted in his own graphic manner the unselfish devotion of a noble life.

This closed the evening session, and the meeting adjourned to meet on the following day at the West Penn Station, where a special train took the party to Creighton to visit the plate-glass works. On entering the building the first object which struck the visitors was the enormous waste of natural gas going on. The entire structure was *lighted* with it, and the burners were not unlike huge tomato cans, from which the light flared in a broad flame. The gas is also used in the melting furnaces, and several plates were cast and rolled for our inspection; they were at once put into the annealing furnaces, and were readily handled by ingenious mechanical appliances.

From these furnaces the plate goes into the polishing rooms, and is finally delivered "a thing of beauty and a joy forever"—at least until some small boy tests its strength with some indurated argillaceous compound. Next, the party went to Tarentum to visit a gas-well. This involved a ride of several miles over a rough road in springless wagons, hence there were "no flowers that bloomed in the spring," and many visitors became *engines*, and got out and walked. This ride superinduced a desire for the elegant lunch which followed, and which all thoroughly enjoyed.

The party next visited the Crescent Steel Works, and were delighted with the beautiful results, especially the delicacy of the steel springs. Thence we visited the works of Messrs. Park & Brother, Limited, and the inspection was likewise *limited*, the Krupp tactics being in vogue, and the inspection confined to a steam-hammer. Whether there was anything more worthy of view, but not desirable to show, or whether it was desired that the visitors should be left to imagine there were many better things there well worthy of examination, it is impossible to say; however, as a view of a steam-hammer, it was a success. A natural gas blow-off was shown by the gas company, and consisted of a structure, resembling a derrick, having four hollow tubular arms forming the frustum of a pyramid. Then small pipes running vertically in the centre were fired by means of a torch drawn up to the top and the effect was grand; one immense flame rolled up into the sky and shed light in all directions, although it was only 3 p. m. It looked at a distance like a flaming cloud floating in the sky. Next the O'Hara Glass Works were visited and the ladies presented with souvenirs, and this concluded the trip.

The evening session consisted of a paper by I. P. Lesley, on the "Geology of the Pittsburgh Coal Region." This was followed by Mr. Garrett's paper on the "Heating of Steel," and Mr. Garrison's paper on the "Microscopical Structure of Car Wheel Iron," illustrated by stereopticon views, concluded the second day.

The third day was entirely given up to reading of papers, and the following were read and discussed: The Mining Compass and Trigonometer, by E. C. Gaertner; Clapp-Griffiths Process, by J. P. Witherow; Recent Failures in Steel Boiler Plates, by Wm. Kent; Soft Steel for Boilers, by Alfred E. Hunt. Prof. Egleston then made some remarks on Steel Rails and on the Manufacture of Cannon. Discussion on the Clapp-Griffiths process followed, and a paper on Iron Ore Deposits of Southern Utah, by Prof. Blake, of New Haven; and Dr. Raymond followed with a description of the Ives Photo-Engraving Process, which was illustrated. The Cornwall Iron Ore Mines were described by Mr. E. N. D'Invilliers, and Submarine Tunneling was discussed by Mr. R. P. Rothwell. The description of the Heine Boiler, by E. D. Meier, of St. Louis, closed the session for the day.

The banquet that evening was a most delightful occasion, and the table was beautifully decorated; one noticeable feature was a tiny gas derrick with pump, ropes and pipe, at the top of which burned a flame of natural gas. There was an elaborate menu and the usual amount of wit and sociability; the details would only aggravate those not fortunate enough to be present, so suffice it to say the banquet was graced by many beautiful and interesting ladies, and that all hands appeared bright and early the next morning to see some of the industries of which Pittsburgh is so justly proud.

First the Duncan Glass Works were visited, and elaborate souvenirs, made of various colored glass, were given to the ladies. Next came the celebrated works of Jones & Laughlin, which employ over 1,000 workmen; here the cold rolled shafting attracted much attention, and the success of this enterprise appeared from the fact that the proprietors are erecting some Bessemer steel furnaces and enlarging their facilities.

The Clapp-Griffiths Works of Oliver Bros. was then inspected and every facility afforded to see their working. The results appear to be extremely satisfactory, and the writer was shown a ⅝ in. strip being rolled for fencing of No. 16 wire. It seemed to work readily, and give the most satisfactory results; 16 rolls were running on the Clapp-Griffiths metal, and the inspection was in every way a satisfactory one. The party now went to the Edgar Thomson Steel Works, which finished the day, and after a short evening session, in which the thanks of the Institute were expressed in the most vigorous and hearty manner to our kind hosts, the meeting was declared closed.

It was a perfect success from every point of view, scientifically and socially, and was well worthy of the genial, generous and unselfish hospitality which has always marked all assemblies of a similar nature in Pittsburgh. We separated to our several homes feeling better, wiser and happier for our brief visit to this Western Metropolis.

Gross or Net Tons, Which?

The *American Manufacturer*, of Pittsburgh, in a recent issue says: "In its report of the production of pig iron the American Iron & Steel Association uses the net or short ton of 2,000 lbs. On the other hand, in the monthly reports of the Western Pig Iron Association the long or gross ton of 2,240 lbs. is used. In the earliest reports of the last-named association the practice of the American Iron & Steel Association was followed, and the reports were given in net tons,

but this created so much dissatisfaction that by a special resolution the secretary was unanimously instructed to change the method and make the reports in gross tons.

"The cause of the action of the Western Pig Iron Association was that pig iron was neither bought nor sold by the ton of 2,000 lbs., but that all transactions in pig iron were in tons of 2,240 lbs., with at times an allowance of 28 pounds per ton for pig iron cast in sand, and why statistics should be given in tons that were not used in pig iron transactions was not apparent. When statistics were given in net tons it required an unnecessary mathematical calculation to get the stocks and production given in the tables into the same kind of ton that the furnacemen were accustomed to use in their transactions. It was also urged that prices for iron were always per gross ton, and either confusion and misapprehension would exist, or else these prices must be changed so as to cover only the ton of 2,000 lbs. Even the American Iron & Steel Association, in its annual reports, though giving the production of iron in tons of 2,000 lbs., quote prices in tons of 2,240.

"We believe that a reform in these methods is necessary. This use of different tons is perplexing and prolific of mistakes, and either the ton of 2,000 lbs. should be adopted in all dealings in pig iron as in the statistics, or the ton of 2,240 lbs. should be adopted all the way through. This is a subject that is worthy the attention of the iron men of the country and journals devoted to the manufacture of iron."

This uncertainty as to the real weight of a ton is apparent to all who have occasion to use or prepare statistics for the coal as well as the iron trade. Thus a ton of anthracite coal in the reports is 2,240 lbs., but in the bituminous coal trade some companies report in tons of 2,240 lbs. and others in tons of 2,000 lbs., so that 10,000 tons reported by one road may be equal to 11,200 reported by another in the same trade and carrying the same kind of coal. A uniform ton is certainly much to be desired.

Lathe for Boring Tires.

The machine which we illustrate is of a type very common in England, but hitherto little known in this country. It is solely designed for boring tires. As all English railroad wheels have tires, the boring of new tires becomes a very important question, especially as it is considered necessary that the wheel skeleton should be turned and the tire bored more accurately than the tread should be turned. The tread being taper, and the head of the rail rounded, the greatest care in turning will never insure that two wheels will run perfectly truly, and as there is considerable difference of opinion as to the best forms for treads of wheel and heads of rail, any excessive care bestowed in making wheels of exactly the same diameter is, to a certain extent, labor thrown away. As, however, a very slight difference in boring a tire or turning the body of a wheel results in either a loose or a burst tire, it is essential that tires should be accurately bored.

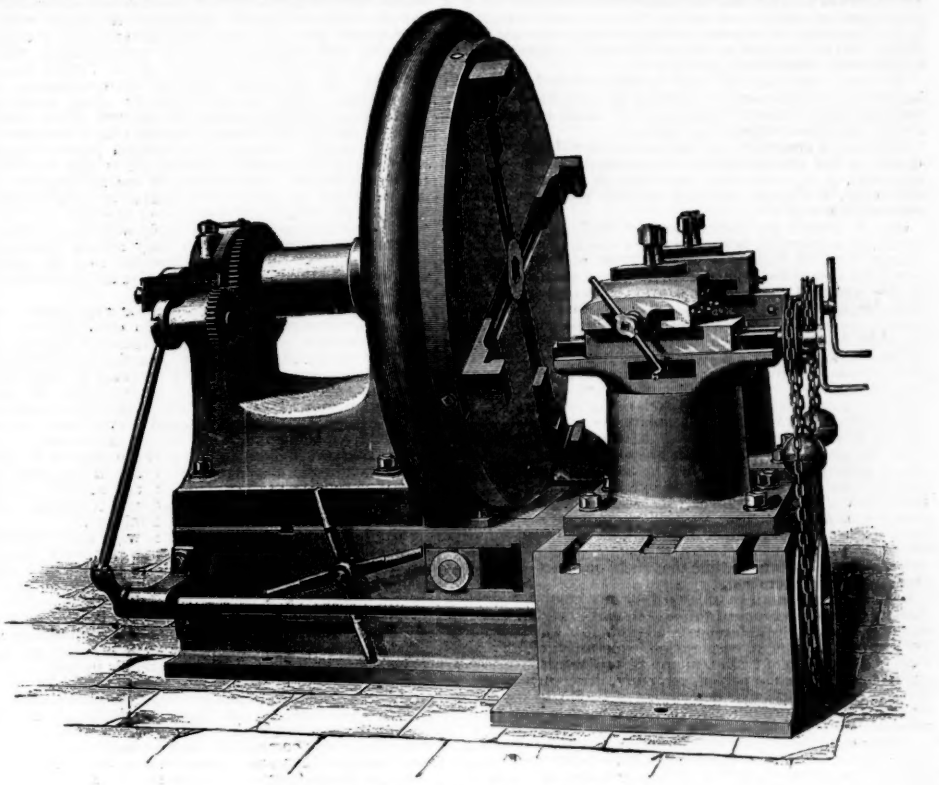
The *Mechanical World*, for which we are indebted for our illustration, says:

"This lathe is one of great power and steadiness, being driven by a worm upon the cone pulley shaft which lies across the bed of the machine and below the face plate, upon the back of which is a solid cut worm wheel shown in our engraving, protected by a stout cast cover to exclude dust. The tool slides are two in number, and are carried upon stout pillars bolted down to the bed. The rests have each the usual cross movements, the longitudinal traverses being coupled by chain wheels and driven from the other end of the lathe by level and rod.

"The cross handle shown in front of the lathe is for the purpose of drawing the driving worm out of gear, the worm shaft bearings sliding in the horizontal slot, as shown in the drawing. When out of gear the face plate may be freely revolved by hand for the purposes of chucking a fresh tire. The face plate spindle is of special cast iron, and runs in gun-metal bearings.

"Our illustration is from a photograph of a lathe with a face plate suited for wheels 48 in. diameter, but similar lathes are made for tires up to 8 ft. diameter."

The makers, Messrs. Hetherington, of Manchester, England, have supplied several of these lathes to the Gateshead Works of the Northeastern Railway. As many of our readers are aware, Mr. T. W. Worsdell, formerly of Altoona, is now Locomotive Superintendent of that line.



LATHE FOR BORING CAR-WHEEL TIRES.

Manufactured by MESSRS. HETHERINGTON, *Manchester, England.*

Rail Joints and Steel Rails.

[Paper read before the British Institution of Civil Engineers by Mr. C. P. Sandberg.]

(*Concluded from page* 126.)

METAL SLEEPERS.

It is a great mistake to diminish the rail-section in consequence of the adoption of metal sleepers, as has been done on some roads; for the metal in the sleeper can in no sense make up for the metal in the rail. The strong rail has the power of spreading the effect of the concussions from the rolling stock over several neighboring sleepers, thus dividing the effect; while the light, weak rail will concentrate the blows on one or two sleepers. Again, the narrow rail-flange will soon wear off the surface of contact, on the skin, of both rail-flange and sleepers; and then fractures will soon occur, as the metal is not in layers, like the iron made from a pile, but forms one homogenous mass in which the least crack may lead to a snap right through. The heavy flange-rail is therefore a *sine quâ non* for the success of a metallic permanent way—if by permanency be meant anything approaching 30 years or more.

In 1880 the United States paid, through their regulation of duties, as much for old worn-out rails as was then paid in England for new steel rails. But even if this should not happen again, the old material will always be equal in value to half the cost of new rails; this, of course, is another reason for not being niggardly in the use of metal when laying down new rails.

It is to be hoped that the iron or steel sleeper now beginning to be introduced, and which may roughly be said to cost as much per ton and weigh as much per mile of line as the rails themselves, will enable the Continental roads to rise to the same standing as the English, and also that the adoption of steel sleepers in England (for their introduction is almost a certainty) will prove economical as well as safe.

But if the weight is to be saved with sleepers, as it has been with the flange-rails on the Continent, it is rather doubtful what will be the result; and, indeed, the few years of experience with metal sleepers on the Continent have shown that they have been made too light.

It is a fact beyond doubt that steel rails and sleepers rust much faster than those made of iron. Why this should be is not quite clear. It may be due to the fact that iron rails and sleepers are rolled at a higher heat than steel, and with floating slag round the pile as a silicate of iron, which is not readily affected by water and atmospheric air; while the steel ingot is rolled at a lower temperature, free from slag, and its pure metallic surface is exposed to the action of air and moisture when put in stack before being laid on the line.

WEIGHT OF RAILS FOR NEW RAILWAYS.

In speaking of the weight of rails from the point of view of safety and economy, a distinction should be made between rails for renewals on railways with increasing traffic, high speed and heavy weight of rolling stock, and those for railways under construction. In the former case, where statistics may indicate that the traffic will be increased, or even doubled, in 10 or 20 years, it is very false economy not to increase the weight of the rail-section. It is wise to begin at once, knowing that it may take a long time before the exchange is fully effected, and as a certainty the public will not concede anything, but will require more comfort and greater speed year by year, which will all tell upon the rail.

But for permanent way in course of first construction the case is different. There two kinds of road should be recognized, according to local circumstances. First, there is the case of flat countries, with small gradients and curves, where an even speed and light traffic is to be expected. For such a case light rails are sufficient, even for standard-gauge lines. For instance, in the south of Sweden there are many such lines now constructed for normal gauge, with 30 to 35-lb. rails, at a cost of considerably less than £2,000 per mile, rolling-stock included, and still this can carry the state-line trucks, and answers all local requirements; but of course the speed is low, the maxium being, perhaps, 15 miles an hour.

But a second case arises in hilly countries, for there it would be very false economy to use such a light rail, where the gradients are steep, say 1 in 60. A heavy rail is, indeed, the salvation of cost of construction of the line, as labor is dear and steel cheap. In this connection, Mr. Mais, Chief Engineer of the South Australian railways, says: "In England it is everywhere considered, by those conversant with the construction and working of railways, that to lay down light permanent-way in hilly districts, where steep gradients must of necessity be used, is the reverse of economy, because, to work steep grades, heavy engines must be used, and therefore a light permanent-way would be inadmissible; but in level countries a light road may be adopted where the traffic is limited, and where there are no steep gradients."

In America the temptation to economize the weight of rails must, however, be immensely greater than it is in Europe, inasmuch as the price of rails is much higher; through 100 per cent. of import duty, the rails were made for years doubly as dear as on this side of the Atlantic, but it is now greatly reduced. It therefore seems fair to suggest that the bad results in the wear of the steel rails in America, now complained of, may be caused by the use of rails which are too light in proportion to the rolling-stock, the speed and the traffic.

It is true that the weight of the American engines and carriages is distributed on more axles than in Europe, and that the bogie is also apt to save the road to some extent; but with increased demand for speed, the total load of the engines and carriages must tell on the rails, and therefore the duration of a comparatively light rail must naturally be less than that of the heavier rail used in Europe, and particularly in England.

REDUCED TESTS FOR STEEL RAILS.

But as regards badly-wearing steel rails, the author knows no better suggestion than to use harder steel (which would necessitate reduction of falling tests), and, at the same time, to use heavier rails. To increase the hardness, while keeping to the same weight of rail, may in many instances prove disastrous, and lead to fracture and accidents. The rail-makers' complaint, that it is the engineers' faults through stipulating too heavy tests and forcing them to make a soft rail, might be true enough, but engineers were quite right to be on the safe side, as long as irregularity in production existed. Now that the time has come that engineers can obtain what they require, it is to be hoped that the change from soft to hard rail, in order to obtain better wearing results, will be effected gradually, and only after very mature consideration of safety before economy.

The factors on the one side are weight of engine, rolling-stock and speed, local circumstances and climate: all this belongs to the rolling-stock department. On the other side, to meet these demands on the permanent-way, the engineer has to consider perfect safety obtained by providing a good road, a good rail, good rail-section of sufficient substance and weight, medium hardness of rail-steel, and a perfect rail-joint.

Unfortunately, however, these two departments do not always pull together, very much to the loss of the shareholders as well as to the risk of the traveling public, and in executing the changes now suggested, the author's greatest wish is that perfect union may exist in the two departments, and that the temptation to economize by using a harder rail may not be effected at the sacrifice of safety; in most instances this can only be obtained by a proportionate increase in section and weight of the rail itself. With this view, the accompanying table for testing steel rails is submitted, in the hope that it will be for the benefit of the producer as well as the consumer.

PROPOSED TEST FOR STEEL RAILS.

Lever Test.					Ball Test.					
Weight per yard	Distance of bearings	Load in tons	Deflection for pieces, 6 feet long rails. Temp.	Deflection for pieces, 6 feet long rails. Perm.	Weight of rail per yard	Distance of bearings	Weight of ball	Height of fall	Proportion of test to weight, per yard	Deflection for pieces 6 feet long rails
Lbs	Ft.		Inches.	Inches.	Lbs	Ft.	Cwt	Feet.		Inches.
30	3	5	⅜	0	30	3	10	6	2.0	2 to 4
		11	⅜ to ¾	⅛ to ½						
35	"	6	⅜	0	35	"	10	8	2.3	2 " 4
		13	¼ to ¾	⅛ to ½						
40	"	8	⅜	0	40	"	10	10	2.5	2 " 4
		18	⅜ to 1	⅛ to ¾						
45	"	10	⅜	0	45	"	10	12	2.6	2¼ " 4¼
		22	½ to 1	⅜ to ¾						
50	"	12	⅜	0	50	"	20	8	3.2	2¼ " 4¼
		25	½ to 1¼	⅜ to 1						
56	"	14	⅜	0	56	"	20	10	3.5	2½ " 4¼
		26	¾ to 2	½ to 1¾						
60	"	16	⅜	0	60	"	20	13	4.3	2½ " 4¼
		32	⅝ to 1¾	⅜ to 1½						
65	"	18	⅜	0	65	"	20	15	4.6	2½ " 4¼
		35	½ to 1½	⅜ to 1¼						
70	"	20	⅜	0	70	"	20	20	5.7	2½ " 4¼
		41	½ to 1¼	⅜ to 1¼						
75	"	22	⅜	0	75	"	20	23	6.0	2½ " 4¼
		43	..	⅜ to 1¼						
80	"	23	⅜	0	80	"	20	25	6.2	2½ " 4¼
		45	½ to 1½	⅜ to 1¼						
85	"	24	⅜	0	85	"	20	26	6.3	2½ " 4¼
		48	½ to 1½	⅜ to 1¼						
90	"	26	⅜	0	90	"	20	29	6.4	2½ " 4¼
		50	½ to 1½	⅜ to 1¼						
95	"	28	⅜	0	95	"	20	31	6.5	2½ " 4¼
		51	½ to 1½	⅜ to 1¼						
100	"	30	⅜	0	100	"	20	33	6.6	2½ " 4¼
		52	½ to 1½	⅜ to 1¼						

The Text of the Cullom Bill.

The following is the full text of the bill reported Feb. 16 last by Mr. Cullom, from the Select Committee on Transportation by Railroad between the Several States, which was read the first and second times by unanimous consent:

A BILL TO REGULATE COMMERCE.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the provisions of this act shall apply to any common carrier or carriers engaged in the transportation of passengers or property by railroad, or partly by railroad and partly by water when both are used for a continuous carriage or shipment from one state or territory of the United States to any other state or territory of the United States, or from any place in the United States to an adjacent foreign country, or from any place in the United States through a foreign country to any other place in the United States, and also to the transportation in like manner of property shipped from any place in the United States to a foreign country and carried from such place to a port of transshipment, or shipped from a foreign country to any place in the United States and carried to such place from a port of entry either in the United States or an adjacent foreign country; *Provided, however*, That the

provisions of this act shall not apply to the transportation of passengers or property, or to the receiving, delivering, storage or handling of property, wholly within one state or territory, and not shipped to or from a foreign country from or to such state or territory as aforesaid.

The term "railroad" as used in this act shall include all bridges and ferries used or operated in connection with any railroad, and the term "transportation" shall include all instrumentalities of shipment or carriage.

All charges made for any service rendered or to be rendered in the transportation of passengers or property as aforesaid, or in connection therewith, or for the receiving, delivering, storage or handling of such property, shall be reasonable and just.

SEC. 2. That if any common carrier shall, directly or indirectly, by any special rate, rebate, drawback or other device, charge, demand, collect or receive from any person or persons a greater or less compensation for any service rendered, or to be rendered, in the transportation of passengers or property, subject to the provisions of this act, than it charges, demands, collects or receives from any other person or persons for doing for him or them a like and contemporaneous service in the transportation of a like kind of traffic under substantially similar circumstances and conditions, such common carrier shall be deemed guilty of unjust discrimination, which is hereby prohibited and declared to be unlawful; and any common carrier who shall violate the provisions of this section as aforesaid shall be liable to all persons who have been charged a higher rate than was charged any other person or persons for the difference between such higher rate and the lowest rate charged upon like shipments during the same period; or if such lower rate was made on any time contract or understanding, the said common carrier shall be liable to pay a like rebate or drawback to all other shippers over the same route between the same points who have shipped goods during the time that such contract or understanding was in operation.

SEC. 3. That it shall be unlawful for any common carrier, subject to the provisions of this act, to make or give any undue or unreasonable preference or advantage to any particular person, company, firm, corporation, or locality, or any particular description of traffic, in any respect whatsoever, or to subject any particular person, company, firm, corporation or locality or any particular description of traffic, to any undue or unreasonable prejudice or disadvantage in any respect whatsoever.

Every common carrier subject to the provisions of this act shall, according to their respective powers, afford all reasonable and proper facilities for the interchange of traffic between their respective lines, and for the receiving, forwarding, and delivering of passengers and property to and from their several lines and those connecting therewith; but no such common carrier shall be required to give the use of its tracks or terminal facilities to another carrier engaged in like business. Any common carrier who shall willfully violate the provisions of this section of this act shall be liable to the person or persons injured thereby for all damages occasioned by such violation.

SEC. 4. That it shall be unlawful for any common carrier to charge or receive any greater compensation in the aggregate for the transportation of passengers or property subject to the provisions of this act for a shorter than for a longer distance over the same line, in the same direction, and from the same original point of departure: *Provided, however*, That upon application to the Commission appointed under the provisions of this act, such common carrier may, in special cases, be authorized to charge less for longer than for shorter distances for the transportation of passengers or property; and the Commission may from time to time make general rules covering exceptions to any such common carrier, in cases where there is competition by river, sea, canal, or lake, exempting such designated common carrier in such special cases from the operation of this section of this act; and when such exceptions shall have been made and published they shall have like force and effect as though the same had been specified in this section.

Any common carrier who shall violate the provisions of this section of this act shall be deemed guilty of extortion, and shall be liable to the person or persons against whom any such excessive charge was made for all damages occasioned by such violation.

SEC. 5. That every common carrier subject to the provisions of this act shall, within 60 days after this act shall take effect, file with the Commission appointed under the provisions of this act copies of its tariffs of rates and fares and charges relating to all classes of traffic affected by the provisions of this act, including classifications and terminal charges which in any wise change, affect, or determine any part of the aggregate of such rates and fares and charges, and from time to time all changes made in the same. Such rates, fares, charges, and classifications shall be made public by such common carriers so far as may, in the judgment of the Commission, be deemed practicable; and said Commission shall from time to time prescribe the measure of publicity which shall be given to such rates, fares, charges, and classifications, or to such part of them as it may deem it practicable for such common carriers to publish, and the manner, extent, and localities to which they shall apply and in which they shall be published.

And when any common carrier shall have established and published its rates, fares, charges, and classifications, or any part of the same, in compliance with the provisions of this section, it shall be unlawful for such common carrier to charge, demand, collect, or receive from any person or persons a greater or less compensation than is set forth and specified in such published rates, fares, charges, and classifications, until the same shall have been changed as hereinafter provided. No advance in such published rates, fares, charges, and classifications shall be made except after 10 days' public notice, but reductions in the same may be made without public notice; and the Commission shall prescribe the manner in which notice of changes, advances and reductions in such published rates, fares, charges, and classifications shall be given.

In cases where passengers and freight traffic pass over lines or routes operated by more than one common carrier, and the several common carriers operating such lines or routes establish joint tariffs of rates or fares or charges, it shall be deemed a compliance with the requirements of this section in respect to the filing of such tariffs if copies of such joint tariffs shall be filed by any one of said common carriers, and the same shall then be published by the common carriers who are parties thereto, in compliance with the provisions of this section; but no common carrier party to any such joint tariff shall be liable for the failure of any other common carrier party thereto to observe and adhere to the rates, fares, or charges thus made and published.

If any common carrier shall neglect or refuse to file or publish its tariffs of rates, fares, and charges as provided in this section, or any part of the same, such common carrier shall be subject to a writ of *mandamus*, to be issued by any circuit court of the United States within the jurisdiction where the principal office of said common carrier is situated, and if such a common carrier be a foreign corporation, in the judicial circuit wherein such common carrier accepts traffic and has an agent to perform such service, to compel compliance with the aforesaid provisions of this section; and such writ shall issue in the name of the people of the United States, at the relation of the Commissioners appointed under the provisions of this act; and failure to comply with its requirements shall be punishable as and for a contempt; and the said Commissioners, as complainants, may also apply, in any such circuit court of the United States, for a writ of injunction against such common carrier to restrain such common carrier from receiving or transporting property among the several states and territories of the United States, or between the United States and adjacent foreign countries, or between ports of transshipment and of entry and the several states and territories of the United States, as mentioned in the first section of this act, until such common carrier shall have complied with the aforesaid provisions of this section of this act; and for any willful violation or failure to comply with the aforesaid provisions of this section the court may award such costs, including counsel fees, by way of penalty, on the return of said writs and after due deliberation thereon, to the Commissioners aforesaid, as may be just.

SEC. 6. That it shall be unlawful for any common carrier subject to the provisions of this act to enter into any combination, contract, or agreement, expressed or implied, to prevent, by change of time schedule, carriage in different cars, or by other means or devices, the carriage of freights from being continuous from the place of shipment to the place of destination; and no break of bulk, stoppage, or interruption made by such common carrier shall prevent the carriage of freights from being and being treated as one continuous carriage from the place of shipment to the place of destination, unless such break, stoppage, or interruption was made in good faith for some necessary purpose, and without any intent to avoid or unnecessarily interrupt such continuous carriage or to evade any of the provisions of this act.

SEC. 7. That any common carrier who shall willfully do, cause to be done, or permit to be done any of the acts, matters, or things in this act declared to be unlawful shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof in any district court of the United States within whose jurisdiction such offense was committed, be subject to a fine of not more than one thousand dollas for each offense: *Provided, however*, That whenever such common carrier is a corporation, its principal officer or traffic manager, by whatever name called, or the agent or person who shall be guilty of any such violation of this act, shall be personally liable as and for a misdemeanor, and upon conviction thereof in any district court of the United States within whose jurisdiction such offense was committed, shall be subject to a fine of not more than one thousand dollars for each offense.

SEC. 8. That a Commission is hereby created and established to be known as the Inter-State Commerce Commission, which shall be composed of five Commissioners, who shall be appointed by the President, by and with the advice and consent of the Senate. The Commissioners first appointed under this act shall continue in office for the term of two, three, four, five and six years, respectively, beginning with the first day of July, 1886, the term of each to be designated by the President; but their successors shall be appointed for terms of six years, except that any person chosen to fill a vacancy shall be appointed only for the unexpired term of the Commissioner whom he shall succeed. Any Commissioner may be removed by the President for inefficiency, neglect of duty or malfeasance in office. Vacancies occasioned by removal, resignation or other cause shall be filled by the President, by and with the advice and consent of the Senate. Not more than three of the Commissioners shall be appointed from the same political party. No person in the employ of or holding any official relation to any common carrier subject to the provisions of this act, or owning stock or bonds thereof, or who is in any manner pecuniarily interested therein, shall enter upon the duties of or hold such office. Said Commissioners shall not engage in any other business, vocation or employment.

SEC. 9. That the Commission hereby created shall have authority to inquire into the management of the business of all common carriers subject to the provisions of this act, and shall keep itself informed as to the manner and method in which the same is conducted, and shall have the right to obtain from such common carriers full and complete information necessary to enable the Commission to perform the duties and carry out the objects for which it was created; and for the purposes of this act the Commission shall have power to require the attendance of witnesses and the production of all books, papers, tariffs, contracts, agreements and documents relating to any matter under investigation, and to that end may invoke the aid of any court of the United States in requiring the attendance of witnesses and the production of books, papers and documents under the provisions of this section.

And any of the circuit courts of the United States within the jurisdiction of which such inquiry is carried on shall, in case of contumacy or refusal to obey a subpœna issued to any common carrier subject to the provisions of this act, or, when such common carrier is a corporation, to an officer or agent thereof, or to any person connected therewith, if proceedings are instituted in the name of such Commissioners as plaintiffs, issue an order requiring such common carrier, officer, agent, or person to show cause why such contumacy or refusal shall not be punished as and for a contempt; and if, upon the hearing, the Court finds that the inquiry is within the jurisdiction of the Commission, and that such contumacy or refusal is willful, and the same is persisted in, such contumacy or refusal shall be punished as though the same had taken place in an action pending in said Circuit Court of the United States.

SEC. 10. That any person, firm, corporation, or association, or any mercantile, agricultural, or manufacturing society, or any body, politic or municipal organization complaining of anything done or omitted to be done by any common carrier subject to the provisions of this act in contravention of the provisions thereof, may apply to said Commission by petition, which shall briefly state the facts; whereupon a statement of the charges thus made shall be forwarded by the Commission to such common carrier, who shall be called upon to satisfy the complaint or to answer the same in writing within a reasonable time, to be specified by the Commission. If such common carrier, within the time specified, shall make reparation for the injury alleged to have been done, said carrier shall be relieved of liability to the complainant only for the particular violation of law thus complained of. If such carrier shall not satisfy the complaint within the time specified, or there shall appear to be any reasonable ground for investigating said complaint, it shall be the duty of the Commission to investigate the matters complained of in such manner and by such means as it shall deem proper.

Said Commission shall in like manner investigate any complaint forwarded by the railroad commissioner or railroad commission of any state or territory, at the request of such commissioner or commission, and may institute any inquiry on its own motion in the same manner and to the same effect as though complaint had been made.

No complaint shall at any time be dismissed because of the absence of direct damage to the complainant.

SEC. 11. That whenever an investigation shall be made by said Commission, it shall be its duty to make a report in writing in respect thereto, which shall include the findings of fact upon which the conclusions of the Commission are based, together with its recommendation as to what reparation, if any, should be made by the common carrier to any party or parties who may be found to have been injured; and such findings so made shall thereafter, in all judicial proceedings, be deemed prima facie evidence as to each and every fact found.

All reports of investigations made by the Commission shall be entered of record, and a copy thereof shall be furnished to the party who may have complained, and to any common carrier that may have been complained of.

SEC. 12. That if in any case in which an investigation shall be made by said Commission it shall be made to appear to the satisfaction of the Commission, either by the testimony of witnesses or other evidence, that anything has been done or omitted to be done in violation of the provisions of this act, or of any law cognizable by said Commission, by any common carrier, or that any injury or damage has been sustained by the party or parties complaining, or by other parties aggrieved in consequence of any such violation, it shall be the duty of the Commission to forthwith cause a copy of its report in respect thereto be delivered to such common carrier, together with a notice to said common carrier to cease and desist from such violation, or to make reparation for the injury so found to have been done, or both, within a reasonable time, to be specified by the Commission; and if, within the time specified, it shall be made to appear to the Commission that such common carrier has ceased from such violation of law, and has made reparation for the injury found to have been done, in compliance with the report and notice of the Commission, a statement to that effect shall be entered of record by the Commission, and the said common carrier shall thereupon be relieved from further liability or penalty for such particular violation of law. But if said common carrier shall neglect or refuse, within the time specified, to desist from such violation of the law or to make reparation for the injury done, in compliance with the report and notice of the Commission as aforesaid, it shall be the duty of the Commission to forthwith certify the fact of such neglect or refusal, and forward a copy of its report and such certificate to the district attorney of the United States for the judicial district in which such violation of law occurred, for redress and punishment as in this act provided.

SEC. 13. That it shall be the duty of any district attorney to whom said Commission may forward its report and certificate as provided in the next preceding section of this act, when it shall appear from such report that any injury or damage has been sustained by any party or parties by reason of such violation of law by such common carrier, to forthwith bring suit, in the Circuit Court of the United States in the judicial district wherein such violation occurred, on behalf and in the name of the person or persons injured, against such common carrier, for the recovery of damages for such injury as may have been sustained by the injured party; and if on the trial of said cause judgment shall be rendered against said common carrier, the Court may allow a reasonable attorney's fee to the district attorney for prosecuting said cause, to be taxed as part of the costs; and in case of failure to recover, the United States shall pay the necessary costs of suit.

In any case where the Court shall adjudge that the violation of law by any such common carrier has been willfully continued after notice by said Commission to desist therefrom, the Court may award to any party injured such a gross sum, by way of costs, as will reimburse all his costs and expenses, to be paid by such common carrier.

And when it shall appear by such report and certificate of the Commission that any common carrier has neglected or refused to desist from the violation of the provisions of law cognizable by such Commission, in compliance with the notice of said Commission, it shall also be the duty of the district attorney to forthwith apply by petition, in the name of the United States, to the Circuit Court of the United States for such district for a temporary injunction against such common carrier and for an order on said common carrier to show cause why it should not be enjoined and restrained from the continuance of such alleged violation, and for such other and further relief as may be just in the premises. And when such petition and the report of the Commission and its certificate showing that said common carrier persists and continues to violate the law have been filed as aforesaid, it shall be the duty of such court thereupon to issue a temporary writ of injunction restraining said common carrier from doing any further act in violation of the provisions of this act or other law cognizable by said Commission, as set forth in the report of the Commission, until said cause can be fully heard. Such court may enforce obedience to any such injunction, order or decree, whether temporary or on final hearing made perpetual, by fine, proceedings for contempt and by any or all other means within its lawful jurisdiction sitting as a court of equity; and for the purpose of making any order or decree in the premises, final or otherwise, such court shall be always open.

If any district attorney shall fail to apply for such temporary injunction and order to show cause, any person interested to restrain such violation may, on application to the Court, be allowed to appear and be heard by himself or counsel, and to apply for such injunction and order; and such court may, in its discretion, appoint other counsel to prosecute proceedings. The Circuit Court of the United States shall have jurisdiction to try such causes without regard to the citizenship of the parties thereto or the amount involved therein.

SEC. 14. That the Commission may conduct its proceedings in such manner as will best conduce to the proper dispatch of business and to the ends of justice. A majority of the Commission shall constitute a quorum for the transaction of business, but no Commissioner shall participate in any hearing or proceeding in which he has any pecuniary interest. Said Commission may, from time to time, make or amend such general rules or orders as may be requisite for the order and regulation of proceedings before it, including forms of notices and the service thereof, which shall conform, as nearly as may be, to those in use in the courts of the United States. Any party may appear before said Commission and be heard, in person or by attorney. Every vote and official act of the Commission shall be entered of record, and its proceedings shall be public upon the request of either party interested. Said Commission shall have an official seal, which shall be judicially noticed. Either of the members of the Commission may administer oaths and affirmations.

SEC. 15. That each Commissioner shall receive an annual salary of $7,500, payable in the same manner as the salaries of judges of the courts of the United States. The Commission shall appoint a secretary, who shall receive an annual salary of $3,500, payable in like manner. The Commission shall have authority to employ and fix the compensation of such other employés as it may find necessary to the proper performance of its duties, subject to the approval of the Secretary of the Interior.

The Commission shall be furnished by the Secretary of the Interior with suitable offices and all necessary office supplies. Witnesses summoned before the Commission shall be paid the same fees and mileage that are paid witnesses in the courts of the United States. All of the expenses of the Commission, including all necessary traveling expenses incurred by the Commissioners, or by their employés under their orders, in making any investigation in any other places than in the city of Washington, shall be allowed and paid, on the presentation of itemized vouchers therefor approved by the Chairman of the Commission and the Secretary of the Interior.

SEC. 16. That the principal office of the Commission shall be in the city of Washington, where its general sessions shall

be held; but whenever the convenience of the public or of the parties may be promoted or delay or expense prevented thereby, the Commission may hold special sessions in any part of the United States. It may, by one or more of the Commissioners, prosecute any inquiry necessary to its duties, in any part of the United States, into any matter or question of fact pertaining to the business of any common carrier subject to the provisions of this act.

SEC. 17. That the Commission is hereby authorized to require annual reports from all common carriers subject to the provisions of this act, to fix the time and prescribe the manner in which such reports shall be made, and to require from such carriers specific answers to all questions upon which the Commission may need information. Such annual reports shall show in detail the amount of capital stock issued, the amounts paid therefor, and the manner of payment for the same; the dividends paid, the surplus fund, if any, and the number of stockholders; the funded and floating debts and the interest paid thereon; the cost and value of the carrier's property, franchises, and equipment; the number of employés and the salaries paid each class; the amounts expended for improvements each year, how expended, and the character of such improvements; the earnings and receipts from each branch of business and from all sources; the operating and other expenses; the balances of profit and loss; and a complete exhibit of the financial operations of the carrier each year, including an annual balance-sheet. Such reports shall also contain such information in relation to rates or regulations concerning fares or freights, or agreements, arrangements, or contracts with other common carriers, as the Commission may require; and the said Commission may, within its discretion, for the purpose of enabling it the better to carry out the purposes of this act, prescribe (if, in the opinion of the Commission, it is practicable to prescribe, such uniformity and methods of keeping accounts) a period of time within which all common carriers subject to the provisions of this act shall have, as near as may be, a uniform system of accounts, and the manner in which such accounts shall be kept.

SEC. 18. That the Commission shall, on or before the first day of December in each year, make a report to the Secretary of the Interior, which shall be by him transmitted to Congress, and copies of which shall be distributed as are the other reports issued from the Interior Department. This report shall contain such information and data collected by the Commission as may be considered of value in the determination of questions connected with the regulation of commerce, together with such recommendations as to additional legislation relating thereto as the Commission may deem necessary.

SEC. 19. That the said Commission shall specially inquire into that method of railroad management or combination known as pooling, and shall report to Congress what, if any, legislation is advisable and expedient upon that subject.

SEC. 20. That nothing in this act shall apply to the carriage, storage, or handling of property free or at reduced rates for the United States, state, or municipal governments, or for charitable purposes, or to or from fairs and expositions for exhibition thereat, or the issuance of mileage, excursion, or commutation passenger tickets, and nothing in this act contained shall in any way abridge or alter the remedies now at law provided, but the provisions of this act are in addition to such remedies. But no person, association, or corporation shall at the same time prosecute any complaint before said Commission and pursue his or its remedy at law; and lodging a complaint before such Commissioner shall suspend, until the same is disposed of, the common-law remedy; and it is expressively provided that no pending litigation between railroad companies shall in any way be affected by this act.

SEC. 21. That the sum of ——— thousand dollars is hereby appropriated for the use and purposes of this act for the fiscal year ending June 30, 1887, and the intervening time anterior thereto.

THE SCRAP HEAP.

Railroad Young Men's Christian Association.

The Association at Topeka, Kan., issues a monthly journal known as the *Way-Bill*. For January it reports 1,236 visitors to the rooms and a total attendance of 1,699 at meetings, receptions and classes. Eight religious meetings were held during the month, with a large attendance. A number of books have been received for the library, but there is still room for many more. Arrangements are being made for a course of practical lectures in March and April.

Hunting for Freight.

The back districts of Brooklyn were the scene one day last week of an unexpected and not altogether harmonious meeting of freight agents. On that morning nearly every one of the contracting freight agents in New York received a business-like postal card, purporting to come from the Kings County Hydraulic Machine Works at Kingston avenue and Winthrop street, Brooklyn, and asking him to name the lowest rate to Omaha on 300 tons of machinery. Nearly every freight agent in the city started out to secure this heavy shipment, but on reaching Kingston avenue and Winthrop street, each one found nothing but an apparently bottomless sea of mud and a very small blacksmith shop. The only building at all resembling a factory which was in sight, proved on inquiry to be the Kings County Lunatic Asylum, an institution which was not prepared to negotiate for any shipment, either of freight or passengers. It is said that a brief convention was held, at which resolutions were unanimously passed in a very hurried manner, and the meeting broke up with each member vowing vengeance on the author of the hoax, if he could be found. It would hardly be safe to mention the Kings County Hydraulic Machine Works in any of the freight offices on Broadway for some time to come.

The Suburban Conductor's Trials.

"You wonder how we can pick out the passengers who have not paid their fare?" said the suburban conductor; "it is rather queer, but it is our business. It is a thing that comes to us by practice. For instance, we make a stop and 15 or 20 people get aboard. It is, of course, impossible for us to tell where they have taken seats. They mix with the passengers who have already paid their fare. On going through the train we have no assistance in picking out the new passengers excepting our memory of faces. And it is quite remarkable how much our memory will do for us. I can't explain it. It is something beyond explanation. But as I go through a car looking at the faces of all my passengers here and there, I pick out a man who I am sure has not paid his fare. And I am nearly always right.

"I often catch myself wondering how it is done—I surprise myself; but I only know that we do it. Of course we sometimes make mistakes, and sometimes we miss passengers. But not often, considering the hundreds whom we collect fare from every day. There is one thing which assists us, especially on the runs into towns, and that is that a large per cent. of our passengers occupy the same seats day after day. A given car is loaded almost the same one morning as it was the previous morning, and just as it will be next week. We become so accustomed to seeing certain faces in certain seats, that any changes from the custom are quite noticeable. You would be surprised if you knew the regularity with which most suburban passengers travel. They come in by the same train almost every morning in the year, and I know some men who are mad as they can be if anybody else gets their seats.

"On the out runs, of course, there is not the same trouble in getting all of the fares. With few exceptions the passengers all get aboard at the city station, and one fare-taking settles the whole thing. The few who get aboard afterward are easily watched and taken care of. Another thing that helps us is that passengers who are mean enough to beat us if they could, can't stand to be looked at. Not one in ten has the cheek to bluff it through when we come along and, suspecting that he has not paid, look him square in the face and reach out a hand for his ticket. He doesn't care for us, or for the honesty of the thing, but he thinks the other passengers are watching him, and thinking how small a man must be who will lie for 10 cents, and he comes down with his ticket like a little man. It is a hard life, though, this suburban conductor business. Up early and late, and all the time fighting a train load of people, among whom are always many beats, trying our best to get all of the fares. It is a great strain on a man's nerves, and yet we are all the time expected to look pleasant and be polite."—*Chicago Herald.*

TECHNICAL.

Locomotive Building.

The Pittsburgh Locomotive Works in Pittsburgh have several orders on hand and are running to their full capacity. Besides locomotives, these works are building a number of boilers and small engines for use in oil well drilling.

The Tanner & Delaney Engine Co. in Richmond, Va., is now building 5 locomotives, some of them standard and some narrow gauge.

The Car Shops.

The Boston & Maine shops, in Lawrence, Mass., have nearly completed a new parlor car of unusual length, intended for use in the summer travel next season. The car is finished in mahogany inside. It is carried on paper wheels. The shops have just completed 5 combination baggage and smoking cars for the road.

The Pittsburgh, Fort Wayne & Chicago shops in Allegheny, Pa., have commenced work on 350 gondola cars for the road.

Jackson & Woodin at Berwick, Pa., are building 400 freight cars for the Delaware, Lackawanna & Western road.

Car Couplers.

The Smillie car coupler has been in experimental use on the Delaware, Lackawanna & Western for the last two years, and is to be now applied to 900 cars on that line.

Bridge Notes.

The Niagara Bridge Works in Buffalo, N. Y., have received the contract for a highway bridge over the Erie Canal, at Fultonville, N. Y. The bridge will be 75 ft. span, with roadway 17 ft. wide, and a 5-ft. sidewalk.

The Vermont Construction Co. is the name of the organization which will hereafter carry on the business of bridge manufacturing in the old rolling mill buildings at St. Albans, Vt. The new concern is a branch of the Hawkins Bridge Works, at Springfield, Mass., and the works were leased by Mr. Hawkins some months since.

Iron and Steel.

The Millerton Iron Co. has put its furnace at Irondale, N. Y., into blast. The furnace has been completely remodeled.

Baird Furnace in the Hocking Valley district in Ohio, has gone out of blast for necessary repairs, but will be started up as soon as possible.

Cold Spring Furnace at Cold Spring, N. Y., on the Hudson River, has gone into blast after a long stop. The furnace will make Bessemer pig, using anthracite as fuel.

Jones & Laughlin, of Pittsburgh, have commenced to build an additional stack at their Eliza Furnace near Pittsburgh. The new stack will be 85 ft. high and 20 ft. bosh, and is expected to make 200 tons of pig iron a day.

Peekskill Furnace at Peekskill, N. Y., will shortly go into blast, making Bessemer pig.

The Edgar Thomson Steel Works at Braddock, Pa., will shortly commence work on an order for 15,000 tons of rails, to be used in laying standard track on the St. Louis & Cairo road.

Manufacturing and Business.

Messrs. Gardner & Co., the patentees and manufacturers of the well-known and widely-used perforated veneer seating and ceiling, have removed their office and salesrooms to No. 206 Canal street, corner of Mulberry street, in New York city.

The Allen Paper Car Wheel Co. has elected Mr. Wm. H. Fenner President in place of Mr. A. G. Darwin, resigned. Mr. Fenner will have his office in New York. He is widely known among railroad men from his long connection with the Rhode Island Locomotive Works.

The Wabash shops at Decatur, Ill., are now run by a 75 H. P. Westinghouse engine, which has recently been put in. The Florida Railway & Navigation Co. has lately ordered of the Westinghouse Machine Co. a 35 H. P. engine for its shops at Fernandina, Fla. and another of 65 H. P. will be put in the new shops at Galveston, Tex., for the Gulf, Colorado & Santa Fe road.

The Rail Market.

Steel Rails.—The market is quiet and steady, with prices unchanged at $34.50@$35 per ton at mill for Eastern mills, although it is said that $34 has been accepted for one or two very desirable orders. Sales of nearly 80,000 tons are reported, including one lot of 20,000 tons for the Union Pacific and one of 10,000 tons for the St. Paul, Minneapolis & Manitoba roads. There is not much demand for light rails at present.

Rail Fastenings.—The market is quiet, but prices are steady in expectation of an increased demand. Quotations are 2.40 cents per lb. for spikes in Pittsburg; 2.75@3.10 cents for track-bolts, and 1.70@1.80 for splice-bars.

Old Rails.—The market for old iron rails is weak and unsettled, and quotations are nominally at $21@$23 per ton at tidewater. Old steel rails are in some demand, and are quoted at $22.50@$25 per ton in Pittsburgh, according to length.

Boston Society of Engineers.

The regular monthly meeting of this Society was held in Boston, Feb. 17.

The President of the Society, Prof. G. L. Vose, occupied the chair. A committee was appointed by the chair to present a list of candidates for office for the ensuing year, which will report at the next meeting. After some routine business had been transacted, Mr. H. L. Walling read an essay on State Topographical Surveying. The paper was essentially a résumé of the improvements in the methods of surveying during the last 30 years, the improvement being so great that maps can now be drawn with such a degree of accuracy that the liability of error is reduced to a minimum.

In a few remarks at the close of the reading of this essay, Prof. Vose stated that he had some doubts as to the accuracy of the contour lines of the map now being drawn for the State. It had been said before the commission at the State House that the lines would be of such accuracy that a railroad might be located from them. This, he thought, would be a somewhat difficult matter.

Prof. Vose's remarks gave rise to an animated discussion on the subject, some of the members contending that the surveys necessary for the map could be done at the price to be paid by the state, $10 per square mile. Others were of opinion that $25 was the lowest price at which the work could be accomplished.

At the conclusion of the discussion, Mr. H. Bissell read a paper on Different Methods of Preserving Railroad Ties, after which the meeting adjourned.

A New Underground Road in London.

A new underground cable railroad is proposed for London, running from King William street, passing under the Thames and terminating at the Elephant & Castle, a distance of 1¾ miles. There are to be three intermediate stations. The track is to be double in distinct tunnels, and the total cost is estimated at $1,500,000, or less than half the cost per mile of the existing underground railroads. Elevators will enable passengers to reach the street level. The line is to be completed in 18 months. Sir John Fowler, the Engineer of the underground lines, acts as Consulting Engineer of the new undertaking.

Blast Furnaces of the United States.

The *Iron Age* gives its usual monthly statement of the condition of the blast furnaces of the country, showing the number and capacity of furnaces in and out of blast Feb. 1, 1886. "In a condensed form the table makes the following showing as to the condition of the furnaces Feb. 1, 1886:

Fuel.	In blast. No.	In blast. Weekly capacity.	Out of blast. No.	Out of blast. Weekly capacity.
Charcoal	52	7,403	171	16,633
Anthracite	107	30,100	114	25,329
Bituminous	113	55,254	100	40,278
Total	272	92,757	391	82,240

"This statement shows an increase on Feb. 1, as compared with Jan. 1, 1886, both in the number in blast and the capacity of anthracite and coke furnaces and a decrease in the number and capacity of charcoal stacks.

"As compared with a year ago the increase in coke and anthracite furnaces in blast is quite marked. At that time but 81 anthracite furnaces, with a weekly capacity of 21,189 tons, were in blast, and 87 bituminous, with a weekly capacity of 46,653 tons. The number of anthracite furnaces has increased in the years 26 stacks, or to 107, an increase of 32.1 per cent., and the weekly capacity of those in blast to 30,100, or nearly 50 per cent. in product. The bituminous furnaces have increased in number 26, or 29.8 per cent., and in capacity to 55,254 tons, or 18.4 per cent."

Traveling Ballast Crushers.

The Chicago, Rock Island & Pacific Railroad is fitting up two portable ballast crushers, consisting of a Gates crusher and a Westinghouse engine, coupled together, and mounted on a flat car.

A Railroad of Bridges.

On the Auburn Division of Chief Engineer P. F. Brendlinger's Pennsylvania Schuylkill Valley Railroad, in a distance of a trifle over two miles, there is the remarkable number of six iron bridges. The first bridge of the series is just below Auburn, and is said to be the finest bridge on the road. This bridge is built on a compound curve and is over 700 ft. in length, consisting of two deck truss and two through truss spans, the whole bridging the Schuylkill River, the Philadelphia & Reading Railroad and the canal. This bridge contains nearly 3,000 cubic yards of first-class masonry and over 500 tons of iron.

The next bridge crosses Pine Creek at its entrance into the Schuylkill River. This bridge consists of three through spans, and is also built on a curve and on a skew, that is, the masonry is built at a lesser angle than a right angle to the line of the railroad.

We then pass the Trout Run bridge and come to the large bridge crossing the Schuylkill River and canal. This bridge, which is only second to the Auburn bridge, consists of two through truss spans, being 320 ft. in length and also built on a great skew. Owing to the size of pier and depth of water, a crib and caisson was first sunk and the masonry commenced on the crib. The masonry of this, as well as that of all the other bridges, is what is termed first class. Going ahead a few feet more, the road again crosses the Schuylkill River on a curve. This bridge consists of two deck spans, and here, too, the artistic is combined with the substantial. Next we come to the canal-cut bridge, spanning the canal cut as its name indicates. This fine bridge consists of one through truss span of 103 ft. and is built on a heavy 8° curve and on a great skew. The greatest difficulty was encountered on all these bridges in laying the foundations, owing to the treacherous material composing the beds of the rivers, the material being mostly mud or silt. The total cost of these bridges will be in the neighborhood of a quarter of a million of dollars. The Auburn Division is in charge of Engineer Theodore Low, ably assisted by O. B. Magruder, Franklin Duane and John Shuster.—*Pottsville (Pa.) Miners' Journal.*

Aluminum Iron and Steel.

One of the great difficulties in making castings from steel is to get a product which is solid, sound, homogeneous, or free from blisters or cavities. The addition of ferro-manganese and other compounds containing carbon, silicon and manganese makes the product somewhat more solid, but deteriorates the quality in other respects, as the product gets harder and more brittle or red short. It has been impossible to make castings of wrought iron or mild steel at the same time solid and retaining their qualities and their strength.

The *Scientific American* states that Mr. Nordenfelt, the inventor of the well-known machine gun, has discovered that solid castings of wrought iron or mild steel may be obtained without changing the intrinsic quality of the metal, by the addition of the metal aluminum, either alone or in the shape of an alloy. The aluminum makes the molten metal more liquid, thus the gases in the metal pass easily away, the metal runs easily into the molds, and a more perfect product is obtained. Even a minute quantity of metallic aluminum added to the molten iron has an appreciable influence. Perfect castings of considerable ductility and great tensile strength have been made from the softest wrought iron. The iron or steel is melted in crucibles, converters, or metal smelting furnaces of any description, and the addition of the aluminum or alloy of aluminum is made to the metal when molten, shortly before it is to be poured. The addition may, however, be made earlier. It is convenient to provide a plug in the cover of the crucible, which is removed when the mental is completely melted, a tube is inserted into the aperture, and the aluminum to be added is passed down the tube. The tube is removed and the plug replaced, and the metal is soon ready for pouring.

RAILROAD GAZETTE

Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

DRESSED BEEF AND LIVE STOCK RATES.

The announcement of an advance in the rates on live stock and dressed beef last week was spoken of by many newspapers as an attempt to extort unreasonably high rates for one of the necessaries of life, one generally sane journal saying that it would probably make the cost of butchers' meat in New York from 2 to 8 cents per pound higher than it has been, while the whole freight charge from Chicago amounts only to 0.35 cent per pound for cattle and 0.65 cent for dressed beef. The freight, in fact, even when it is highest, is but an insignificant part of the cost of meat to the city consumer, as any one may know when he compares the above figures with the prices he pays, or even with the difference between New York prices and Chicago prices—it being probably not one-eighth part of that difference.

Moreover, the new rates are not, as might be supposed, exceptionally high, but are the lowest ever regularly made. Last year, when all other rates were reduced below what any one claimed to be reasonable, live stock and fresh meat rates were reduced also, and when cutting had been going on for some time a halt was called at 25 cents for live stock, more as a basis for settling balances in the live stock pool, probably, than for anything else; for no attempt was made to maintain rates, any more than on other freight, though balances were paid in accordance with the live stock pool, which was not done with other freight.

The chief charge made, however, is that the new rates make a discrimination against dressed beef, the traffic in which has been very greatly developed within the last few years, and that the railroad companies desire to destroy that business; and it is intimated that private interests in stock yards, abattoirs, etc., have had more to do with it than the true interests of the railroads.

When it was attempted before to establish reasonable rates on these freights, an investigation was held, in which not only all the railroads interested took part, but also the chief shippers of live stock and dressed beef. Detailed statements were made by the representatives of both classes of shippers, and there probably never has been in this country so elaborate an investigation for the purpose of fixing upon a just basis of rates for two competing traffics. Mr. Albert Fink made a report upon the evidence submitted, and the reports and an abstract of the proceedings during the investigation were printed in an octavo volume of 134 pages. Mr. Fink reported, after the investigation was held, that the evidence indicated that with the rate of 40 cents per 100 lbs. on live stock then established, 77 cents seemed to be a proper rate for dressed beef—a difference of 37 cents per 100 lbs.

Later the question was left to the arbitration of Judge Cooley, assisted by one representative of the live stock and one of the dressed beef shippers. He reported in favor of making the dressed beef rate 75 *per cent.* higher than the live stock rate, and as the live stock rate was then 40 cents, this made the dressed beef rate 70 cents. It would be only 3¾ cents less with the new live stock rate, and this is positively the only change made in the relative rates of the two traffics.

No change in these rates was designedly made until this, which goes into effect next Monday, but, as has been the case with live stock rates most of the time for years, the rates carefully considered and designed have been the actual rates but a small part of the time, and the actual rates have been the result of accident, have changed frequently, and have been so irregular that it is impossible to say what they have been or what the difference between the live stock and dressed beef rates has been since the Cooley award, except that since last April not more than 25 cents has been received for carrying live stock, and that the dressed beef rate has not been nearly as much as 30 cents higher, though we believe that more has been collected than the 43¾ cents which the Cooley award would make it when the live stock rate is 25 cents, and that dressed beef shippers have large claims pending for the excess against railroad companies which carry no live stock.

Now, whether the railroads have succeeded or not in making a proper difference in these rates, it is certain that they have taken extraordinary pains to do so; that they have consulted the parties concerned in both traffics, and have left the decision of the question to disinterested parties, whom no one can suspect of desiring to destroy either the live stock or the dressed beef trade. It is difficult to see how greater pains could have been taken to reach a proper conclusion: yet seldom have we known the announcement of a change in rates to be so much complained of as unjust and arbitrary.

This is due, doubtless, to the fact that the shippers who complain that the difference is too great are men of great wealth and influence, and that they have industriously used their influence to make the public believe that the railroads were doing a great wrong from which it would suffer. There is naturally a sharp competition between the dressed beef shippers and those interested in the live stock traffic, and each interest uses every effort to get the better of the other, and to make all it can for itself. They have so shrewdly played their game—the different live stock shippers before the dressed meat business began, and now the two in competition with each other—that probably for more than half of the time for the last ten years or more they have had the use of the railroads for nothing—that is, the rates have been so low that there was no profit in the business to the railroads. This is a traffic which might easily and properly be made to pay much more profit than the average through freight. It must go wholly by rail; it cannot be accumulated in great stocks at the places of consumption, like grain and provisions, but must be moved every day; the cost of transportation is but a small proportion of the cost of the meat to the consumer, and the average yearly consumption of an individual in New York probably does not cost as much as two days' wages of a day laborer for transportation. But, largely by the fault of the railroads themselves—by their failure to act together—the live stock business has gone largely into the hands of a few shippers, and those who shipped by one road constantly sought to make their road help them in their trade competition, and have succeeeded to a very great extent. When the shipper by the Pennsylvania Railroad insisted that the New York Central shipper must be getting cut rates, and declared that the latter was selling in New York for less than the cost, the Pennsylvania was likely to reduce the rate to its shipper, lest it should lose its live stock business. These shippers do not usually care to have the rates very low, but each wants to get an advantage over his competitor, and of course does his best to have his railroad give him such an advantage, and the result much of the time has been that the railroads would have been just as well off if they had had no live stock traffic. A few years ago the railroads through co-operation seemed likely in future to be able to get a profit on the business, when the growth of the dressed beef traffic, which is conducted on an immense scale by a very few persons, created a new complication, which we have not yet seen the end of.

It seems not to be generally known that the dressed beef is carried from Chicago chiefly by railroads which have scarcely any live stock traffic. A single railroad carried 59 per cent. of all the dressed beef shipped from Chicago during the last eight months of last year, and this railroad carried but 0.2 per cent. of the live cattle. Another road had 15.9 per cent. of the dressed beef and 4.5 of the cattle, so that these two roads took more than three-fourths of the dressed beef. On the other hand, a line which carried 31½ per cent. of the cattle had but 4.6 per cent. of the dressed beef.

Now, a railroad which carries a large share of the cattle and little or no dressed meat cannot help desiring that the dressed beef business should not increase, for it cannot increase without decreasing that road's business; and *vice versa*. But as there are railroads on each side, it is certain that transportation rates cannot be collected which will destroy either business. The railroad which carries great quantities of beef and no cattle will never charge a rate which will deprive it of all or the greater part of its business.

It is probable, however, that since the live stock rate went down to 25 cents the dressed beef business has had an undue advantage. The Cooley award at the time it was rendered made the rate 30 cents higher for beef than for cattle; but with a 25-cent live stock rate (which was never contemplated), it made the difference only 18¾ cents. If the first of these differences was just enough, the second must have been too small. Unfortunately the first difference was not maintained long enough, or strictly enough, to make it possible to say positively just how it worked. But there is reason to believe that the actual differences last year gave the beef a considerable advantage, for the shipments of it increased greatly. In the first four months of 1885 there were 144,428 tons of cattle and 64,975 tons of dressed beef shipped from Chicago, or 100 tons of beef to 222 tons of cattle: in the last eight months of that year, under the 25-cent live stock rate, the shipments were 242,091 tons of cattle and 166,658 of beef, or 100 tons of beef to 145 tons of cattle. In the first period the shipments of live stock *per month* were 36,107 tons; in the last, 30,261 tons; while the beef shipments were 16,244 tons per month in the first period and 20,832 in the second. There was thus a large growth in the dressed meat shipments and a corresponding decrease in the cattle—a greater change in so short a time than is likely to occur simply from the natural advantages of so new a business.

A letter from Mr. Armour, one of the chief shippers of dressed beef, tends to give a wrong impression of the facts by stating only the percentages of the differences between the cattle and beef rates at different times without giving the actual rates. When the regular live stock rate was 60 cents, a difference of 50 per cent. was just as great as the difference just made, though the latter is more than 80 per cent. of the new live stock rate. But it is the amount and not the percentage which is of importance, and there has never been any agreement which was intended to make the difference less than 30 cents. Whether that is too great or too small a difference, we do not believe that it is now possible to say. The facts have been obtained from the shippers, and each party has made out the best case possible for its side, and the actual rates have been very irregular. Then the two classes of shippers have had a very hot competition with each other, and we cannot positively say that the actual position of either is not partly due to accepting lower trade profits than the other has made. Experience *with rates strictly maintained* will soon show whether the difference is too great or too small, and probably nothing else can. If under these rates it is impossible for either business to be conducted with profit in competition with the other, the rates will not last a month. Even if one business has a large legitimate natural advantage over the other, as the circumstances now are, rates cannot be made so as to destroy the other business, though the business which has a considerable advantage must ultimately prevail. If each of the railroads received as large a share of the one traffic as of the other, they might be indifferent; but actually, as we have seen, some lines carry scarcely any live stock and some scarcely any dressed beef; and for such roads the destruction of one business means the absolute destruction of an important part of their business. A live stock road will carry live stock at any rate above bare cost, rather than lose the traffic entirely and get nothing in place of it. It will not be helped at all if the dressed beef, taking the place of the cattle, pays several times as grea a profit as it can get from the cattle, because the profit goes to another road.

There is no doubt that the proprietors of stock-yards and slaughter-houses in the East use all their influence to prevent the growth of the dressed beef business, and would like to have the difference in rates so great as to prohibit it; but it is just as true that those interested in the dressed beef trade, which requires provision of refrigerator cars, for icing on the way, and for cold storage at destination, are just as much interested against live stock, and the recent figures indicate that the dressed beef business is now, at Chicago at least, about as important as the cattle business. Indeed, the 166,658 tons of dressed beef shipped from Chicago in the last eight months of last year should have been equivalent to about 292,380 tons of cattle, and in that time only 242,091 tons of cattle were shipped. One interest may well be set off against the other.

A TRANSCONTINENTAL RAILROAD WAR.

The transcontinental railroad lines for the first time in their history are engaged in open warfare. It is several months since the Transcontinental Association expired, but in hopes of renewing it, it was generally agreed to maintain the Association rates as near as might be, with the hope that it would be renewed at the meeting last week. Previously it was understood that the stumbling-block was the refusal of the Southern Pacific to pay over certain balances which had accrued against it by the terms of a certain arbitration; but at last week's meeting this difficulty seems to have been removed, and the failure to agree was the claim of the Atlantic & Pacific line (on this side the Atchison, Topeka & Santa Fe, also, but only for a short distance, the St. Louis & San Francisco) for a share of the business, which the other lines regarded as altogether inadmissible, amounting to 50 per cent. of the Southern California business, and 28 per cent. of the other California business, making 30 per cent. of the whole. In the old pool the Union Pacific (reaching the coast by the Central Pacific) had 42 per cent., the Southern Pacific 25, the Atlantic & Pacific 23, and the Denver & Rio Grande and the lines working in connection with it 10 per cent.

Recently the Atlantic & Pacific has completed a line from the coast at San Diego, in the southwestern corner of California, north 210 miles to its California line, and made a contract with the Southern Pacific which gives it running rights over the latter to Los Angeles. It therefore can make its own rates and run its own trains to these two places, the first of which is a place with a good harbor, but with little trade, while Los Angeles is the metropolis of Southern California, shipping large quantities of fruit and wine. By far the larger part of the population and production of Southern California is on the lines of the Southern Pacific, however, which has several branches there; and while the Atlantic & Pacific would seem quite as well placed as the Southern Pacific for carrying to and from Los Angeles (being a more direct line to the country which consumes most of the Southern California produce), the Union Pacific claims a share of the business of this part of California, so that if the Atlantic & Pacific got 50 per cent., and the Union Pacific any, the Southern Pacific would have less than the Atlantic & Pacific. Not only were the several lines unable to agree on percentages, which was to be expected, but the Atchison, Topeka & Santa Fe (Atlantic & Pacific) is said to have refused to submit the question to arbitration, which naturally was fatal.

There has been more or less irregularity in the transcontinental freight rates for a long time, but probably chiefly confined to shipments from the Atlantic coast, which are not a large quantity. These have gone very largely by steamer to New Orleans and thence by the Southern Pacific. But this route is not available for shipments to or from places a little way inland, and the larger part of the transcontinental traffic is probably with such places.

The disagreement of last week was followed immediately by a great reduction in fares. The fares from Omaha or other Missouri River points to San Francisco had been $90 for first-class unlimited tickets, $84 for limited, and $45 for second-class tickets. Immediately these were reduced to $60, $50 and $25 respectively, and this week, the Chicago, Burlington & Quincy taking the initiative, we believe, a further reduction was made to $30 for first-class limited and $20 for second-class. The distance by the shortest route is 1,865 miles, and the first-class limited rate is about equivalent to $15 from New York to Chicago. The regular first-class rates have always been high, the limited by the short line having been 4½ cents per mile, which may be the reason that the second-class travel on these lines has been larger probably than on any others in this country. The fact that unlimited first-class tickets are sold for $60 indicates that there will not be soon, if ever, a return to the old rate, since these tickets are good until used, and if return to the $90 rate should be made, a large stock of these tickets would be likely to stand in the way.

It is not necessary for the Union Pacific and Northern Pacific to make reductions as great as those to Oregon and Washington in order to hold the traffic, since the cost of the voyage from San Francisco to Portland must be added to the cost of the ticket to San Francisco to make the rate to Portland by the competing lines; but with $54 cut from the San Francisco fare, an important reduction to Portland follows.

The reduction in freight rates seems to be irregular; probably terms are made with each shipper, and large reductions made only in the rates on the higher classes. Contrary to the common opinion, the average transcontinental freight rates are not high. The distance is so great that a high rate would be prohibitive for many kinds of freight. In 1884 the Union Pacific earned an average of 1.15 cents per ton per mile on its trancontinental freight. Neither is this traffic very large. When a single line had the whole of it, as was the case not long ago, it yielded it a large income; but not only has the multiplication of lines divided it into many parts, but the rates on it have been reduced. For four years the Union Pacific's gross earnings from this traffic were:

1881.	1882	1883.	1884.
$3,703,657	$2,746,473	$2,512,507	$1,695,006

showing a decrease of $2,008,651, or 54 per cent., from 1881 to 1884. The net earnings were doubtless reduced in a still greater proportion, and judging by the average cost of carrying on this road, they were not more than $575,000 in 1884, which is not 6½ per cent. of its total net earnings. Yet it had much more of the freight then than any other road.

The contest certainly involves much smaller amounts than many that attract less attention, but while the losses may not be large in amount, they fall upon companies for the most part ill able to bear them. The Atlantic & Pacific in 1884 did not make its working expenses, but it controlled the California part of its line only in the last quarter of that year, and probably was not able to carry a transcontinental traffic to advantage then. The Atchison, Topeka & Santa Fe pays one-fourth of its earnings from traffic interchanged with the Atlantic & Pacific toward paying interest on the latter's first-mortgage bonds if the latter's net earnings are not sufficient. Evidently current rates will net a loss to both roads, and the payment to be made by the Atchison from the reduced rates will not be a very large sum. Neither the Union Pacific, the Southern Pacific, nor the Northern Pacific pays dividends, and the latter's surplus over fixed charges is painfully small. The Chicago, Burlington & Quincy is fortunate under the circumstances in not having a large share of this traffic over its lines from the Missouri River to Denver, and it can lose all its profits on it and something more, without affecting its dividends; the same may be said of the Denver & Rio Grande, except that it has no dividends to lose. The Atchison, Topeka & Santa Fe is likely to suffer more than any other dividend-paying road, for the only other is the Oregon Railway & Navigation Company, and though it carries all the Oregon and Washington traffic, it will probably suffer less in proportion than the lines further south, because, as there seems to be no contest over this business, Oregon rates are not likely to fall so low as California rates.

A very large increase in the California travel may follow these great reductions in the fares. California is regarded as one of the wonders of the world, and people of all classes desire to see it. Even with the old fares, many farmers and other people of small means, especially in the West, have visited it, and they are much more likely go there for pleasure than to Europe or the South. A reduction of $54 in the fare one way should, it would seem, induce many to go who could not afford to go at the old rates. The distance is so great that a reduction like that which is sometimes made between New York and Chicago amounts to a very large sum. During the sharp competition last year the journey could be made from New York to Chicago for $10 less than the regular fare; while on the Omaha-San Francisco fare the reduction is now $54.

Doubtless the reduction to $30 was made in hopes that it would shorten the contest, and it is likely to have that effect, though it may last a long time yet.

We do not remember any time when confidence in the maintenance of rates on trunk line traffic between the seaboard and the Mississippi was so general and so little affected by any irregularity or suspicious circumstance. Not long ago the probable result of the action of the Chesapeake & Ohio in the latter part of January in taking more than half of the total St. Louis shipments would have been a general reduction of east-bound rates. The other St. Louis roads would have made reductions to prevent the diversion of their business; this would have diverted business from Peoria and caused a reduction there, and then a reduction at Chicago and a general break would have come, all because for a week or two a few thousand tons out of some hundreds of thousands had gone out of their usual course. But the St. Louis roads were restrained and the evil confined within the narrowest possible limits, and though nothing definite, perhaps, was obtained by negotiation, the diversion was not continued, at least not to the same extent. More recently when, as elsewhere noted, suddenly two Chicago roads which had been taking very little of the grain shipments thence began to take an extraordinarily large share, the other roads regarded the change with such complacency that one might have suspected that they had designed it. Even when some recalcitrant company refuses to agree to anything, and seems disposed to do all the harm it can, its competitors seem not to be alarmed, but to feel confident that it can be and will be prevented from doing much harm.

This disposition of itself does more than almost any thing else to prevent the demoralization of rates usually caused by a number of different lines acting not only independently but hastily.

The thirteen additional railroads reporting their January earnings this week are all small ones except the Pennsylvania and the Grand Trunk. Seven of them report an increase over last year. It is noticeable that all the gains except one are by Southern roads, but their aggregate gain is but $24,660, while a single Southern road (Mobile & Ohio) has a decrease of $34,876. The January earnings of some of the principal roads reporting this week have been:

	1882.	1883.	1884	1885.	1886.
Grand Trunk	$1,380,135	$1,322,673	$1,113,615	$1,118,021	$1,011,657
Cin., N. O. & T. P.	196,923	185,720	188,256	200,67 7	193,865
Mobile & Ohio	159,676	216,212	179,228	201,681	166,805
Nash., C. & St. L.	170,733	197,388	186,962	184,986	185,519

The Grand Trunk's serious decrease has been continuous since 1882. Since last year it is 9 per cent., since 1884 12½ per cent., since 1883 23½. The exceptionally light through shipments from the West last January were bad for it, the more so because it did not carry its usual share of the smaller total. The Cincinnati, New Orleans & Texas Pacific earned more than in any other year except last year, the Nashville & Chattanooga about the same as for two years previous, but the Mobile & Ohio earned less than in any other year since 1882.

The aggregate earnings of the 77 railroads that have reported so far were in January.

	1886.	1885.	Decrease.	P. c.
Earnings	$19,012,489	$20,008,596	$1,996,107	5 0

The gain by the Pennsylvania indicates a gain by the other two great Eastern roads that have yet to report, but a large loss is to be expected on the Chicago, Burlington & Quincy.

January Accidents.

Our record of train accidents in January, given elsewhere, contains notes of 35 collisions, 54 derailments and 5 other accidents; 94 accidents in all, in which 41 persons were killed and 90 injured.

Nine collisions, 8 derailments and 2 other accidents caused the death of one or more persons each; in 10 collisions and 6 derailments there was injury to persons, but not death. In all 19 accidents caused death or fatal injury, and in 16 others there were lesser injuries, leaving 59, or 63 per cent. of the whole number, in which there was no injury to persons severe enough for record.

The 35 collisions caused 23 deaths and 44 injuries to persons; in the 54 derailments there were 16 persons killed and 36 hurt, while in the 5 other accidents 2 persons were killed and 10 hurt.

Of the persons killed 40 and of those hurt 67 were railroad employés, that class of persons thus furnishing 98 per cent. of the killed, 74½ per cent. of the injured and 81¾ per cent. of the whole number of casualties.

As compared with January, 1885, there was a decrease of 51 accidents, an increase of 16 in the number of killed and a decrease of 92 in that of injured.

These accidents may be classed as to their number and causes as follows:

COLLISIONS:	
Rear	20
Butting	10
Crossing	5
	— 35
DERAILMENTS:	
Broken rail	6
Broken frog	2
Broken bridge	1
Spreading of rails	4
Broken wheel	1
Broken axle	3
Broken truck	1
Cattle	2
Land-slide	2
Wash-out	1
Snow or ice	18
Misplaced switch	7
Rail removed for repairs	1
Malicious obstruction	1
Unexplained	4
	— 54
OTHER ACCIDENTS:	
Boiler explosion	2
Broken parallel-rod	1
Caving of tunnel	1
Car burned while running	1
	— 5
Total number of accidents	94

Five collisions were caused by misplaced switches; four by snow; two by mistakes or misunderstanding of orders; two by failure to use signals; one by fog, and only one by a train breaking in two.

The only broken bridge recorded failed by reason of the partial washing out of a pier by high water.

A general classification of these accidents is made as follows:

	Collisions.	Derailments.	Other.	Total.
Defects of road	..	13	..	13
Defects of equipment	1	5	3	9
Negligence in operating	29	8	..	37
Unforeseen obstructions	5	23	2	30
Maliciously caused	..	1	.	1
Unexplained	..	4	..	4
Total	35	54	5	94

Negligence in operating is thus charged with 39 per cent. of all the accidents, defects of road with 14, and defects of equipment with 9½ per cent.

A division according to classes of trains and accidents is as follows:

Accidents:	Collisions.	Derailments.	Other.	Total.
To passenger trains	5	20	2	27
To a pass. and a freight	9	..	..	9
To freight trains	21	34	3	58
Total	35	54	5	94

This shows accidents to a total of 129 trains, of which 41 (32 per cent.) were passenger trains, and 88 (68 per cent.) were freight trains.

Of the total number of accidents 60 are recorded as happening in daylight and 34 at night.

The record for the month is unusually favorable for a winter month. Setting aside the snow derailments the number of accidents was really small. The most notable point in the collisions is that only one resulted from a broken coupling—a very unusual report. Misplaced switches caused 5 collisions and 7 derailments, 12 accidents in all, or over one-eighth of the whole number. There were 18 derailments caused by the snow-storms of the month, which is probably but a fraction of the real number; but accidents of this class, while very troublesome, are seldom very serious or fatal, and may be regarded as unavoidable incidents of a northern winter.

For the year ending with January the record is as follows:

	Accidents.	Killed.	Injured.
February	216	44	259
March	86	17	84
April	81	14	75
May	62	8	65
June	75	24	115
July	76	28	75
August	92	37	172
September	91	25	98
October	123	36	134
November	96	19	118
December	74	31	153
January	94	40	90
Total	1,166	323	1,438
Total, same months, 1884-85	1,189	357	1,702
" " " 1883-84	1,619	474	1,954
" " " 1882-83	1,395	394	1,289

The yearly average for the four years was 1,342 accidents, 387 killed and 1,671 injured The monthly average for last year was 97 accidents, 27 killed and 120 injured.

The averages per day for the month were 3.03 accidents, 1.29 killed and 2.90 hurt; for the year, they were 3.19 accidents, 0.88 killed and 3.92 injured.

The average casualties per accident were, for the month, 0.426 killed and 0.957 hurt; for the year 0.277 killed and 1.233 injured.

January makes a showing better than the average, except in the number of persons killed, which was exceptionally large.

Chicago through rail shipments eastward for the week ending Feb. 20, for the last two years, by the incomplete report, giving only flour, grain and provisions, but for previous years by the complete report, giving freight of all kinds, have been, in tons:

1880.	1881.	1882.	1883.	1884.	1885.	1886.
46,780	48,921	57,662	61,533	45,014	39,837	48,146

Thus the shipments this year were a fifth more than last year. The non-reported freight has been from 12,000 to 16,000 tons per week, and adding the smaller quantity to enable us to compare with years previous to 1885, we have the total shipments this year more than in any other year except 1883, and about the same as then and one-third more than in 1884. This is the first week that the shipments have been more than in the corresponding week of last year, and it is due not only to an increase over previous weeks this year, but to a great decrease from previous weeks last year, when there were bad blockades. Last year the winter shipments were at their maximum in the first week of February, when they were 81,975 tons, falling to 46,041 in the second week, and to 39,837 in the third week. Then there was a falling-off of 42,138 tons in the two weeks, while this year there has been a gain of 14,996 in the same time. Later last year, about the middle of March, the 15-cent rate went into effect, and the shipments became very large again until after the middle of May.

For seven successive weeks the total Chicago shipments and the percentage taken by each railroad have been:

	Week ending Jan. 9.	Jan. 16.	Jan. 23.	Jan. 30.	Feb. 6.	Feb. 13.	Feb. 20.
Tons:							
Flour	3,206	3,804	4,416	3,551	5,564	4,366	6,247
Grain	17,056	10,713	12,736	12,344	17,868	22,789	34,851
Provisions	8,913	8,965	8,800	9,351	9,738	9,348	7,048
Total	29,175	23,482	25,952	25,246	33,170	36,503	48,146
Per cent.:							
C. & Grand T.	7.7	7.2	7.5	9.0	8.5	13.1	22.7
Mich. Cen.	13.4	12.0	12.0	12.0	12.1	11.4	11.7
Lake Shore	16.5	14.7	16.3	13.5	13.2	11.4	8.4
Nickel Plate	8.7	6.4	8.3	7.5	11.1	16.7	15.6
Ft. Wayne	16.2	23.7	18.1	21.6	18.9	18.1	16.4
C., St. L. & P.	11.8	16.4	12.4	16.1	13.2	13.1	15.1
Balt. & Ohio	13.5	12.0	14.9	11.1	11.3	6.4	4.4
Ch. & Atlantic	12.2	7.6	10.5	9.2	11.7	9.7	5.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Thus the total shipments last week were nearly one-third more than the previous week, and still greater than in any previous week of this year, there being, compared with the previous week, an increase of 43 per cent. in flour and of 53 per cent. in grain, but a decrease of 23½ per cent in provisions. The grain shipments have nearly doubled in two weeks, and nearly trebled in three weeks, and this is what might be expected to follow a considerable reduction in rates.

The changes in percentages are even more suspicious than the week before, the Chicago & Grand Trunk, which for the five weeks ending Feb. 6 had taken on the average only 8 per cent. of the whole, carrying 22.7 per cent. of the larger shipments and nearly one-half more than any other road—nearly twice as much as the Michigan Central, and nearly three times as much as the Lake Shore. The Chicago & Grand Trunk is much behind in the pool, and there should not be any objection to its getting its share as fast as may be by any process which does not demoralize rates. The Chicago roads, except the Chicago & Atlantic, have agreed to pool the shipments and the divisions are to date from Jan. 1, and if any road is short the other roads will have to make good its shortage at full rates. But the Michigan Central and the Lake Shore are short too, and at last week's rate would soon be very far behind. The Nickel Plate again last week had much more than its usual share; the Baltimore & Ohio and the Chicago & Atlantic much less.

The Chicago & Grand Trunk's freight was seven-eighths of it grain, of which it took no less than 27½ per cent. of the whole, while the Nickel Plate took 20 per cent., leaving but 52½ for the six other roads, including the five old ones, the Lake Shore taking about 7 per cent. of it. It is not easy to believe that the shipments distributed themselves naturally in this way, especially when these roads took but a very small part of the grain in previous weeks, the tons of this freight carried by each having been:

	Week ending Jan. 9.	Jan. 16.	Jan. 23.	Jan. 30.	Feb. 6.	Feb. 13.	Feb. 20.
C. & Grand T.	954	540	568	615	1,643	2,772	9,592
P. c. of total	5.6	5.0	4.5	5.0	9.3	12.2	27.5
Nickel Plate	1,193	662	957	1,184	1,909	4,962	6,934
P. c. of total	7.0	6 2	7.5	9.6	10 7	21.8	19.9
Both p. c.	12.6	11.2	12.0	14.6	20.0	34.0	47.4

Thus the two roads which in January weeks took one-ninth, one-eighth and one-seventh of the grain, last week took nearly one half of it, carrying 1,799 tons in the last week of January, and 16,526 tons, *nine times* as much, in the third week of February. If we subtract what these roads have taken, we shall find that the grain shipments by the other six roads have been:

Week ending Jan. 9.	Jan. 16.	Jan. 23.	Jan. 30.	Feb 6.	Feb. 13.	Feb. 20.
14,909	9,511	11,211	10,545	14,316	15,055	18,325

Of the total increase of 22,507 tons in grain shipments since the last week of January, no less than 14,727 tons have been by the other two roads, and of the gain of 16,983 tons from the first to the third week, they had 12,974 tons, or more than three-fourths—which doesn't look right.

When grain and flour shipments became so small as they were last January, the live stock and dressed beef shipments became nearly one-third of the total east-bound through shipments from Chicago. During last January, while all the other through freight amounted to 167,665 tons, live stock and dressed beef were 77,148 tons. The latter were probably as large as a year ago, but the other freight was 154,408 tons (48 per cent.) less. If reasonable rates had been obtained for the live stock (it probably just about paid cost), it should have yielded nearly half as much profit as all the other freight, but last year about one-fourth as much. This is a traffic the amount of which is scarcely affected at all by changes in rates, and the advance which goes into effect next Monday will make a material (and very much needed) addition to the profits of the trunk lines and their Western connections. Indeed, it is one of the most important changes made since rates were at their worst last summer, and the wonder is that nothing was done about it sooner. Last year the total Chicago shipments of live stock and dressed beef were 850,020 tons, which should have yielded a profit of two to three times that number of dollars; but it is questionable if it yielded any profit, and it was left unprofitable for five months after rates on other traffic were advanced. It remains to be seen whether the new rates can be maintained. They have always been much more unmanageable than other rates, and have been badly cut when other rates were well maintained. It will be a great triumph for the present organization if it succeeds in maintaining them.

The Northwestern grain receipts, which became very small after December, have increased now to quite respectable figures, being considerably larger in the second week of this month than in the corresponding week of last year, when however, there was great obstruction by storms. For six successive weeks the total grain receipts of the Northwestern markets have been, in *thousands* of bushels:

Year.	Week ending Jan. 9.	Jan. 16.	Jan. 23.	Jan. 30.	Feb. 6.	Feb. 13.	6 weeks.
1886	2,802.3	1,863.3	2,988.8	3,724.8	4,094.0	5,071.9	20,545.1
1885	4,786.7	5,694 5	4,611.9	5,625.4	7,370.6	3,758.6	31,847.7
1884	4.171.8	3,594.4	5,061.1	4,246.0	4,723.8	4,417.8	26,214.9
1883	4,383.2	3,974.7	3,684.9	3,245.0	5,414.9	3,503.9	24,206.6
1882	2,719.1	4,252.7	4,725.7	5,297.6	4,869.7	4,325.8	26,190 6
1881	2,987.7	2,890.3	2,760.7	3,289.6	3,050.1	2,460.3	17,438.7
1880	3,867.1	2,739.4	3,123.3	3,652.1	2,990.0	4,279.2	20,660.1

The receipts this year were the smallest since the stormy winter of 1881, but very nearly the same as in 1880, which was very favorable. The receipts for the week to Feb. 13 last, however, though exceeded in three out of the six weeks last year, were never exceeded before except in the first week of February, 1883, and the last week of January, 1882, so that they may fairly be called large. Last year the receipts were exceptionally small in the third as well as the second week of February, and with a free movement of corn it is reasonable to expect that for the remainder of the season this year will be better than last and compare well with other years.

There was suddenly a great increase in the corn receipts at Chicago in the week to Feb. 13, such as might be expected to result from a sudden considerable reduction in rates to the east; and it was reasoned that there had been such reductions secretly made to meet cuts previously made at St. Louis, which were said to be diverting corn from Chicago. If so, there must have been a further cut at St. Louis, for while the Chicago corn receipts increased 51 per cent. from the first to the second week of February, the St. Louis receipts increased 95 per cent. meanwhile; and while Chicago proportion of the total receipts increased from 39 to 42⅜ per cent., St. Louis's share increased from 20 to 29 per cent. The probability is that changes in rates, if there were any, had little or nothing to do with the increase in receipts, which had been less than was to be expected, but since the bad weather in January have risen to something like what they should be. For each of the six weeks ending with Feb. 13, these Northwestern corn receipts have been for nine successive years, in *thousands* of bushels:

Year.	Week to Jan. 9.	Jan. 16.	Jan. 23.	Jan 30.	Feb. 6.	Feb. 13.	6 weeks.
1886	1,067.5	517.8	1,289.9	1,729.4	1,841.0	2,578.0	9,023.6
1885	2,195.3	2,438.1	2,028,3	2,4:7.3	3,669.3	1,923.8	14,672.1
1884	1,778.4	2,586.3	2,312.2	2,845.7	2,665.5	2,408.5	14,596.6
1883	1,840 4	1,684.8	1,621.7	3,040.8	1,847.5	2,297.4	12,332.6
1882	1,232.3	2,319.3	2,584.6	2,922.5	2,682.3	2,293.8	14,034.8
1881	1,290.9	1,249.8	1,245.2	1,573.9	1,472.9	1,181.7	8,064.4
1880	1,939.7	1,478.9	1,930.3	2,492.2	2,061.7	2,996.7	12,899.4
1879	1,119.9	1,299.0	1,345.9	1,457.1	1,302.5	1,548.0	8,072.4
1878	865.5	1,624.2	1,029.0	909.8	1,031.6	827.9	6,288 0

Thus it appears that the Northwestern receipts for the six weeks were less this year than in any other since 1881, which was the most terrible of winters, and the receipts were small then in spite of an exceptionally large crop and an enormous surplus to be marketed, as was proved by the fact that it came forward in immense quantities in the spring and summer. The receipts of the last week in the table (to Feb. 13) were little more than the average weekly receipts last year and the year before. There is, therefore, nothing suspicious in the amount of the receipts. Incomplete returns for the week to Feb. 20 indicate that the corn receipts then were but little less than the week before.

A further indication that the rates have not changed is that corn shipments from the Northwestern markets have not increased nearly as much as the receipts, having been:

Week ending Jan. 23.	Jan. 30.	Feb. 6.	Feb. 13.	Feb 20.
701,622	902,944	1,060,864	1,071,125	1,281,963

The figures from last week being subject to revision.

The Pennsylvania Railroad report for January is favorable, so far as gross earnings are concerned, showing an increase over last year on the lines east of Pittsburgh and Erie amounting to $144,014, or 4.4 per cent., in a month when most railroads further west reported a decrease. The increase in working expenses was larger than that in earnings, however, so that there was a small decrease in net earnings, making them the smallest since 1878. Gross and net earnings and working expenses of the lines east of Pittsburgh and Erie have been, for the last eight years:

January Earnings and Expenses, Pennsylvania Railroad.

	Gross earnings.	Expenses.	Net earnings.
1879	$2,543,424	$1,523,893	$1,019,531
1880	3,083,551	1,717,253	1,366,298
1881	4,189,215	1,982,354	1,206,861
1882	3,373,321	2,299,055	1,074,266
1883	3,929,357	2,458,299	1,471,058
1884	3,574,233	2,408,097	1,161,136
1885	3,277,522	2,291,948	985,574
1886	3,421,536	2,474,995	946,541

The gross earnings this year were exceeded only in 1884 and 1883, but the net earnings were the smallest since 1878 and 15½ per cent. less than in 1874. The decrease in net earnings since 1883 is $524,517, or 35⅜ per cent.

The lines west of Pittsburgh and Erie have yielded a surplus or deficit in January as follows:

1879—Surplus	$161,627	1883—Surplus	$221,800
1880— "	305,304	1884—Deficit	110,585
1881— "	381,207	1885— "	42,807
1882— "	42,748	1886— "	129,707

So that last January was worse for them than any other since 1878, though the decrease of $86,900 from last year is an extremely small part of the net earnings of this immense system.

This leaves the income from the two systems as follows:

1879	$1,181,153	1883	$1,692,858
1880	1,671,602	1884	1,050,551
1881	1,588,068	1885	942,767
1882	1,117,014	1886	816,834

Thus the result of the operations of the company last January was extremely unfavorable, the income being 14 per cent. less than last year, 22 per cent. less than in 1884 and 51¾ per cent. less than in 1883. The decrease since 1883 in this single month is equivalent to 0.9 per cent. on the stock now outstanding.

The light east-bound freight movement tended to reduce the earnings of this road last January, but the greater activity in manufacturing should have increased them materially, though some important industries on this road were paralyzed by strikes. The increase in gross earnings is a favorable indication.

The Denver, South Park & Pacific Railroad, which came into the possession of the Union Pacific shortly before it became unprofitable, has smaller freight trains than any other line in the United States which reports, the average being 7⅞ cars in 1884 and 9⅜ in 1883, and the average freight train loads being 24 tons and 31¼ tons in these years, the average of all United States railroads being 129 tons in 1880. The average passenger train load was not so much below the average, being 41.2 in 1884 and 51.6 in 1883, while the average for the whole United States in 1880 was 44¾. At the time when the world was in a hurry to get to Leadville, and was glad to pay 10 cents a mile to get there, this road coined money; when the world wanted to get away from Leadville it hadn't so much money to spare, but still enough to give this road large earnings. But now fares appear to be as low as in New England, for the earnings per passenger train-mile in 1884 were but $1. But

the freight appears to have paid a good, round price, at the rate of 6⅝ cents per ton per mile, but naturally, with so small a train load, did not pay expenses, for the working expenses of this road in 1884 were $1.20 for every dollar of earnings, and the line, which in 1880 returned $996,621 of net earnings, or $6,152 per mile (it being then but 162 miles long), in 1884 netted a *loss* of $293,991, or $917 per mile (there being 321 miles of it). In 1880 the profit was probably some thing like 40 per cent. on the actual cost of the road; in 1885 the excess of expenses over earnings was at the rate of 6 per cent. on the funded debt; and besides that $221,580 was expended for interest on the part of this debt not owned by the Union Pacific Company, and it paid in all $549,193 for the privilege of working the road which the year before it took possession of it returned a profit of nearly twice that amount.

The official tests of the twelve couplers selected at Buffalo are being suplemented, on one road at least, by a test on a small scale which removes the difficulty of which we spoke in our last issue, that "many men of many minds," constitute the tribunal for as many different couplers. Mr. E. B. Wall, Superintendent of Motive Power of the Pittsburgh, Cincinnati & St. Louis Railway, has equipped one end of each of two cars with one of the following couplers, all of the "vertical plane" type, viz.: Cowell, Hein, Dowling, Thurmond and Titus & Bossinger. The Janney, the sole remaining one of the six selected "vertical plane" couplers is not included, probably because it has already been pretty thoroughly tested, both in passenger and train service, on the Pennsylvania lines.

The test is not of an official character, but merely to afford some definite light to the management. The expense is small both in money and time, and if a few other roads would do the same thing for both the link and vertical plane types, some valuable unofficial tests and reports might be obtained to supplement those which the Master Car-Builders' committee has set under way, and either confirm or correct them.

The rate of progress on the new Croton Aqueduct tunnel has been very remarkable. On the ten shafts on which the greatest progress was made, the average monthly progress was 32.9 ft. per month, the highest being 70 ft. and the next 41 ft. This is less notable, but on the headings the results attained are almost unprecedented. Working on both headings of 25 shafts for periods of from two to eight months the total progress has been 22,541 ft., or 4.27 miles. On the ten headings where the best progress was made the average progress has been 119.6 ft. per month, the best average being 171.7 ft. On the same heading the greatest single month's progress thus far in any one heading on the line was made, 257.5 ft. of tunnel, 16×16 ft., having been driven in the month from July 25 to Aug. 25 with Ingersoll "Eclipse" drills, through granitic gneiss. This is said to be the fastest tunnel driving on record with any machine drill, except at the Sutro Tunnel in Nevada, where 287 ft. advance was made in December, 1878, and in the east end of Vosburg Tunnel, where 268 ft. of heading (8×29 ft.) was driven in one month.

As an average of the entire work, up to the close of October, 1885, there would appear to have been the equivalent of 230 months' work of one heading done on the 50 headings worked, allowing that the first month's record only covers an average of 15 days. This gives 98 ft. per month *average* progress on the whole 50 headings worked, which is a very extraordinary average for so large a work. The shafts are about 1¼ miles apart, and the total length of the aqueduct is 33¼ miles, all but 3,000 ft. of which is tunnel. As the progress up to last October had averaged close on to a mile per month of active work, it is evident that the completion of even this enormous tunnel—the greatest work of the kind in the world—will not be long delayed.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines is given in the current number of the *Railroad Gazette* as follows:

Blue Spring, Orange City & Atlantic.—Track laid from Blue Spring, Fla., east to Lake Helen, 8 miles.

Jacksonville, Tampa & Key West.—Extended from Enterprise Junction, Fla., south to Sanford, 3 miles.

Wisconsin Central.—Extended from Mukwonago, Wis., south to Burlington, 22 miles; also from River Forest, Ill., northward 15 miles.

This is a total of 48 miles on 3 lines, making in all 162 miles thus far reported for the current year. The new track reported to the corresponding date for 15 years has been:

	Miles.		Miles		Miles.
1886	162	1881	199	1876	224
1885	107	1880	479	1875	80
1884	184	1879	97	1874	104
1883	220	1878	198	1873	304
1882	452	1877	82	1872	201

These figures include *main track only*, second tracks and sidings not being counted.

NEW PUBLICATIONS.

Report of Proceedings of the Eighteenth Annual Convention of the American Railway Master Mechanics' Association, held at Washington, D. C., 1885.

This volume, which is somewhat late in making its appearance, contains as usual much that is of interest to all engaged in the construction or maintenance of locomotives.

A complete list of the various standards adopted by the Association is published for the first time, and may be briefly summarized as follows:

Nuts.—United States Standard.

Screw Threads.—United States Standard.

Switching Engine Mileage.—Switching engines six miles per hour; local freight engines 6 per cent. added to train mileage.

Axles, Bearings and Boxes.—Master Car-Builders' Standard.

Sheet-Metal Gauge.—Brown & Sharpe's.

Limit Gauge for Round Iron.—Pratt & Whitney's.

This volume contains the reports of the respective committees on Boilers; Valve-gear; Improvements in Locomotives; Steel Castings for Locomotives; Bearings; Testing Boilers; and Spark Arresters. These reports contain a great deal of information and are illustrated with numerous engravings.

Full reports of discussions on the following and other subjects are given: The proper thickness of tires and height of driving-wheel flanges; the use of steel fire-boxes; drilling *vs.* punching boiler plates; steel rivets; calking; hollow stays; valve-gear; coupling-rod bearings; steel castings; fire-brick arches; and other subjects.

Both the appearance and usefulness of the book would be considerably improved by the presence of a better index and the absence of numerous printer's errors. A large proportion of the proper names in the book are wrongly spelt. Pratt & Whitney become "Prat & Whitney;" Coatesville, Pa., is disguised as "Coachville, Pa.;" Crewe Works have apparently gone into the dairy business, and figure as "Creme Works;" the Cooke Locomotive Works still retain a liking for their old title, and are printed as "Danforth & Cook' L. W." In the index we find "Steel Cartings for Locomotives," and on page 181 we are introduced to a new verb, to "trinkle." The poet doubtless *should* have said:

"Trinkle, trinkle, little star,
How I wonder what you are!"

The index is very short and incomplete. Some information on the subject of compound locomotives will be found on pages 60, 81 and 107, and two engravings of a compound locomotive are placed facing page 81, yet the only reference to this important subject in the index is "compound locomotives, page 110," where will be found some rather incoherent remarks as to the superior advantage of *non*-compound locomotives.

The brevity and incompleteness of the index are forcibly shown by comparing it with that of the Annual Report of the Master Car-Builders' Association. In the latter, the index contains about 500 entries, while the Master Mechanics' contains only 38.

The list of members giving addresses and names of roads also needs improvement. The practice of merely giving the initials of roads leads to confusion. The letters "C. V." which appear in the list may mean either Credit Valley, or Central Vermont, or Connotton Valley. If the initials are given, they should at least be correct, but it may be doubted whether "E. T. V. A. & G. A." is a correct method of giving the initials of any existing road. These initials, may, however, be found on page 177.

The term "goods engine" is always a stumbling block to the printers of the Master Mechanics' annual report. It is sometimes spelled "Goode's engine" as if it were the special invention of a doubtless worthy and ingenious mechanic, Mr. Goode. In this volume it appears as "Good engine," the printers probably considering it as a locomotive especially distinguished for worthy and upright conduct in private life. The word "goods," though an old and well-used word in the English language, signifying merchandise, and commonly enough used in that sense here as well as in England, has happened to be applied there to goods transported, while Americans have happened to call them freight; but apparently the printers of the Master Mechanics' Report cannot believe that a "goods engine" is the exact equivalent of a "freight engine."

The Association appears to be in a flourishing condition, and now numbers 239 ordinary members, 11 associate members and 10 honorary members, making a total membership of 260, being an increase of 19 members during the last two years. There were present at the last convention 90 members, and 24 new members joined the Association. The attendance shows an increase on former years, 89 members having been present at the Chicago meeting in 1883, and only 79 at the Long Branch convention in 1884. The statement of accounts shows receipts from all sources during the year amounting to $1,811, and an expenditure of $1,871. The Association has an invested reserve fund of $5,300.

It is very creditable to the Association that it should have achieved so much and disseminated so much useful information with such a small annual income as $1,811. Few bodies of men have the control of a larger expenditure than the master mechanics of this country. The amount expended on the running and repairs of locomotives in the United States is probably over $100,000,000 annually, and any reduction of this huge item of the cost of railroad working must be chiefly due to the skill, experience and powers of organization possessed by the master mechanics. It is self-evident that the formation of an Association has widened the experience and increased the capacity of those who take an active part in the proceedings.

The good work done by the Association cannot, unfortunately, be measured, but it has undoubtedly saved American railroads a very large sum, and the persevering inquiries and experiments set on foot by the Association will continually increase this amount, and render transportation cheaper, easier, and safer. An Association with so much good work achieved and so much remaining to be accomplished, richly deserves a high status, and it is pertinent to inquire whether the usefulness of the Association might not be enhanced by the command of larger funds. A great deal of arduous and responsible work falls to the lot of the Secretary and the chairmen of the committees, and at any rate the first-named official should have an adequate recompense for his trouble. A salary of $800 can hardly be said to be a sufficient emolument for the duties of an office which is all important to an association the widely-scattered members of which can only be reached by correspondence.

The annual reports of the Master Mechanics and Master Car-Builders' Associations circulate all over the world, and, judging from the prompt and complete replies received from distant parts of the globe, foreigners take a lively interest in the Associations. The widespread interest which is felt in the proceedings of these bodies is very flattering to their officers and members, and will we trust impel them to do their best to justify the respect and admiration with which they are regarded, by contributing fully and carefully prepared statements in reply to the circulars issued by the Association. They will thus advance not only the art of railroad transportation, but improve their own position both as Associations and individuals in the eyes of their superior officers.

Florida: its Climate, Productions and Characteristics. Issued by the passenger department of the Jacksonville, Tampa & Key West Railway.

This book is one of the neatest and most handsomely illustrated pamphlets which we have received for some time past. It is devoted, of course, to a description of the country along the line of the road, which follows for the greater part of its length the line of the St. Johns River, heretofore the great highway of Florida travel, but whose latest extension leaves that river and runs southward to the comparatively unknown Indian River country. While naturally somewhat enthusiastic in its description, it gives many useful facts in relation to Central Florida, and is by no means merely an advertising sheet. The illustrations are well executed and the subjects well selected, and some of them really make one long to take refuge among the scenes which they depict, from the blizzards from which we have lately been suffering.

TECHNICAL.

Tubman's Sleeping Car.

A somewhat novel design for a convertible sleeping and day car has been introduced by Mr. W. K. Tubman, of Baltimore, Md. The main idea is a series of compartments, formed by removable partitions, along one side of a car with an aisle along the other, and removable yielding berths athwart the car supported upon springs. Curtains separate the berth sections. The berth supports attach to the plates instead of to the roof; the beds are of a single thickness of flexible woven wire, and both the supports and bed bottoms are, at the same time, made taut, to prevent swinging, by a single ratchet and pawl. The whole being integral can quickly be unfastened, folded and stored in a space beneath the windows, under the floor or in a locker at the end of the car. Folding chairs are used. The bed frames are composed of hollow metallic rods ½ in. diameter, covered with woven wire and supported by four coiled springs. The mattress is 3 in. thick, a netting surrounds each bed, and is attached to the tube supports inclosing springs. The tubes turn down upon the bed frame when the berths are folded up and stowed away under the floor. The folding chairs used by day are stowed away at night in a similar manner. The greater room for dressing and the absence of any partitions by day appear to be the most salient advantages conferred by this style of car. The inventor claims that the method of suspending the berths will give a particularly easy motion favorable to sleep.

A New Locomotive Grate.

The Lehigh Valley Railroad Co. is supplying its freight and passenger locomotives with a new form of grate, for which a number of important claims are made. This new device was invented by Isaac W. Swallow, a locomotive engineer on the Delaware, Lackawanna & Western Railroad. The grates are manufactured under the patents of the American Water Bar Grate Co., 1,123 Arch street, Philadelphia, Pa. The grate is made up of two sections, each operated by a lever in the cab. The stationary bars extend the entire length of the grate and are hollow, permitting the circulation of water, so as to prevent overheating. Alternate bars may be shifted for raking and cleaning the fire, with the results, it is claimed, of effecting a large saving of labor over the old method of manipulation. The fire can, moreover, be cleaned of ashes and cinders by this new device without disturbing the burning coal. We understand that the officials of the Lehigh Valley Co. claim that they can save with the new grate from 1 to 1½ tons of coal in a run of 90 miles of an express train. The grate has also been used with a stationary boiler with different kinds of fuel, and from all accounts appears to have given very satisfactory results.—*Iron Age.*

Tests for Cast Steel.

The following tests which the English Board of Trade apply to cast steel anchors will be interesting to those of our readers, who use this material for structures subjected to heavy strains. Cast steel anchors will be subjected to the same proof strains as wrought iron anchors of the same weight, but three test pieces cast on the anchor must first be tested for tensile strength and ductibility. Two pieces must be turned to 1 in. diameter for a length of 10 in. The tensile strength must not exceed 67,000 lbs. per sq. in. and the contraction of area must not be less than 45 per cent., while the elongation must be at least 18 per cent. in 10 in.

The bending test piece must be machined to 1 in. square for a length of 12 in.; and bent by hydraulic ram between supports 10 in. apart until test piece passes between supports. If still uncracked, it is to be bent by pressing the ends together until they break, or until their sides are parallel at a distance of 3 in. apart, measured inside. No fracture or flaw should ensue. The end of the hydraulic ram pressing on the test piece, should be semi-cylindrical, the radius being 1 in., and its depth should be at least 2 in.

Two of the three tests for ductibility, contraction of area, elongation, and bending, must be satisfactory, or the anchor will be rejected. Blow holes, or a tensile strength exceeding 67,000 lbs. per sq. in. will also insure rejection.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Chicago & Alton, annual meeting, at the office in Chicago, April 5.

Chicago, St. Louis & Pittsburgh, annual meeting, at the Union depot in Indianapolis, Ind., March 17.

Illinois Central, annual meeting, at the office in Chicago, March 10.

Missouri Pacific, annual meeting, at the office in St. Louis, at 9 a. m., on March 9. Transfer books close Feb. 6.

New Orleans & Northeastern, annual meeting, at the office in New Orleans. March 1.

Norfolk Southern, annual meeting, at the office in Elizabeth City, N. C., March 4.

Pennsylvania Railroad, annual meeting, at Musical Fund Hall in Philadelphia, at 11 a. m., on March 9.

Peoria, Decatur & Evansville, annual meeting, in Peoria, Ill., March 2.

St. Louis & Cairo, special meeting, to vote on the question of leasing the road to the Mobile & Ohio, in New York, March 15.

Wabash, St. Louis & Pacific, annual meeting, at the office in St. Louis, March 9.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Alton, 2 per cent., quarterly, payable March 1, to stockholders of record Feb 13.

Chicago, Burlington & Quincy, 2 per cent., quarterly, payable March 15, to stockholders of record on Feb. 20.

Delaware & Hudson Canal Co., 1¼ per cent., quarterly, payable March 15, to stockholders of record on Feb. 26. This company drops from 1½ to 1¼ per cent.

Railroad and Technical Convenitons.

Meeting and conventions of railroad associations and technical societies will be held as follows:

The *National Association of General Passenger & Ticket Agents* will meet in Chicago, on Tuesday, March 16.

The *Southern Time Convention* will hold its spring meeting at the Grand Hotel in Cincinnati, on Wednesday, April 14.

The *General Time Convention* will hold its spring meeting at the Grand Hotel in Cincinnati, on Wednesday, April 14.

The *American Society of Mechanical Engineers* will hold its next meeting in Chicago, on Tuesday, May 25.

The *Master Car-Builders' Club* will hold its regular monthly meetings through the winter at the rooms, No. 113 Liberty street, New York, on the evening of the third Thursday in each month.

The *New England Railroad Club* will hold its monthly meetings at its rooms in the Boston & Albany passenger station in Boston, on the evening of the second Wednesday in each month.

The *Western Railway Club* will hold its regular monthly meetings at its rooms, No. 103 Adams street in Chicago, on the third Wednesday in each month.

Sleeping-Car Conductors' Mutual Aid Association

The Sleeping-Car Conductors' Mutual Aid Association was organized at a meeting held in Chicago, Feb. 17, at which a constitution was adopted and officers chosen. The organization is a mutual insurance association, similar to the conductors' association now in existence, and starts off with 260 members from the various sleeping-car lines.

National Association of General Passenger and Ticket Agents.

The following notice from Secretary A. J. Smith has been issued: "The annual meeting of this Association will be held in Chicago, at the Grand Pacific Hotel, Tuesday, March 16, at 11 a. m.

"Blank credentials will be furnished new members at the meeting."

Central Club of Car Accountants.

The Central Club of Car Accountants held its third quarterly meeting in Pittsburgh, Feb. 17, with a fair attendance. Mr. Edmund Yardley, of the Pennsylvania Company, presided, with Mr. D. W. Moore, of the Grand Rapids & Indiana, as secretary.

Communications were received from the Norfolk & Western Co., declining to accede to the action of the Club at its last meeting in relation to fixing mileage for cars. The following subjects were discussed:

Reporting switched cars on the Junction card.

The propriety of roads tracing for cars other than their own.

Roads tracing for car bodies other than their own, but on their trucks.

How can mileage made on foreign roads be checked and verified?

Southern Change of Gauge.

The adjourned meeting of the officers of Southern roads, the gauge of which is to be changed May 31 and June 1 next, met at the Kimball House in Atlanta, Ga., Feb. 16. Nearly all the officers who were present at the previous meeting attended the second one. Mr. H. S. Haines occupied he chair, with Mr. F. K. Huger as Secretary.

Mr. Kline, Chairman of the Committee on Wheel Gauge, submitted a report recommending a standard wheel gauge which gives the distance between flanges of the wheels as 4 ft. 5⅜ in., ⅛ in. variation to be allowed either way; the flanges to be 1¼ in. thick and the minimum distance from out to out of the wheel treads to be 5 ft. 4 in.; any wheels measuring less than this to be rejected.

The report was discussed at some length, and was finally adopted, and the meeting then adjourned.

ELECTIONS AND APPOINTMENTS.

American Institute of Mining Engineers.—At the meeting in Pittsburgh last week the following officers were chosen for the ensuing year: President, Robert H. Richards, Boston; Vice-Presidents, W. B. Cogswell, Syracuse; James F. Lewis, New York; J. D. Weeks, Pittsburgh. Managers, H. M. Howe, Boston; J. E. Johnson, Longdale, Va.; W. G. Neilson, Philadelphia. Secretary, R. W. Raymond, New York; Treasurer, Theodore D. Rand, Boston.

Augusta & Sandersville.—At the annual meeting in Augusta, Ga., Feb. 10, the following were elected: President, R. M. Mitchell; directors, W. B. Young, John Davison, Charles H. Howard, W. T. Gary, N. W. Murphy, Thomas Warthen, James K. Hines, James J. Davis, Joshua A. Smith, James Stapleton, John B. Williams, W. J. Pollard.

Bay City, Caro & Port Huron.—The officers of this new company are: President, Wm. Westover, Bay City, Mich.; Vice-President, Henry Howard, Port Huron, Mich.; Secretary, H. P. Merrill, Bay City, Mich.; Treasurer, Charles Montague, Caro, Michigan.

Chicago & Central Iowa.—The directors of this new company are: Frank L. Underwood, Kansas City, Mo.; Andrew Crawford, Luther A. Pierce, Lakeview, Ill.; Arthur N. Sullivan, James Walsh, Horace Williston, Chicago; Russell Sage, New York.

Cincinnati, New Orleans & Texas Pacific.—General Freight and Passenger Agent H. Collbran, of the Queen and Crescent, has just issued the following official circular:

"Mr. Barnard Brown, having resigned the position of Commercial Agent at New Orleans, the office is hereby abolished. The position of Commercial Agent at Vicksburg is also abolished.

"The following appointments take effect from date: Mr. I. Hardy, to be Assistant General Freight and Passenger Agent, headquarters at Vicksburg, Miss., and will have special charge of the business of the New Orleans & Northeastern, Vicksburg & Meridian, and the Vicksburg, Shreveport & Pacific Railroads. Mr. R. J. Barr, to be Contracting Agent at New Orleans, in addition to his duties as Depot Agent. Mr. A. E. Proctor, to be Soliciting Agent, New Orleans. Mr. J. M. Knight, Ticket Agent, to have charge of passenger and ticket business at New Orleans."

Delaware, Lackawanna & Western.—At the annual meeting in New York, Feb. 23, the old directors were re-elected, as follows: Wm. H. Appleton, Edgar S. Auchincloss, John I. Blair, George Bliss, Benjamin G. Clarke, Gardner R. Colby, Sidney Dillon, Jay Gould, Elias S. Higgins, Wilson G. Hunt, Andrew T. McClintock, Wm. Walter Phelps, Percy R. Pyne, Russell Sage, Samuel Sloan. The board re-elected Samuel Sloan President; F. F. Chambers, Secretary; Frederick H. Gibbens, Treasurer.

Fort Scott Southern.—The directors of this new company are: A. H. Campbell, J. D. Hill, J. J. McCleverly, B. P. McDonald, Isaac Stadden, Fort Scott, Kan.; B. S. Henning, New York.

Fort Wayne, Peoria & Galesburg.—At the annual meeting in Peoria, Ill., Feb. 11, the following officers were chosen: President, A. M. Williams, Fort Wayne, Ind.; Vice-President, Edwin Evans, Fort Wayne, Ind.; Secretary, Martin Kingman, Peoria, Ill.; Treasurer, C. R. King.

Fremont, Elkhorn & Missouri Valley.—Mr. Samuel C. Doty is appointed Assistant Engineer in charge of construction, with headquarters at Chadron, Nebraska.

Hannibal Union Depot Co.—At the annual meeting in Hannibal, Mo., Feb. 9, the following directors were elected: H. B. Stone, Robert Law, J. F. Barnard, W. J. Hilton, S. P. Barnes, M. Kerrigan. The board elected H. B. Stone, President; W. J. Hilton, Secretary and Treasurer; C. N. Lee, Superintendent and Ticket Agent.

Indianapolis & St. Louis.—At the annual meeting of this company (controlled by the Cleveland, Columbus, Cincinnati & Indianapolis) in Indianapolis, Ind., Feb. 17, the following directors were chosen: J. H. Devereux, Stevenson Burke, Truman P. Handy, James Barnett, Amos Townsend, George H. Russell, John T. Dye.

Kansas & Memphis.—The directors of this new company are: C. M. Condon, R. L. Sharp, L. S. Crinn, E. T. Real, C. T. Carpenter, Oswego, Kan.; John D. Perry, S. E. Hoffman, St. Louis.

Kansas Midland.—The officers of this new company are: President, C. R. Miller, Wichita, Kan.; Vice-President, S. W. Campbell, Hutchinson, Kan.; Treasurer, J. O. Davidson, Wichita, Kan.; Secretary, O. H. Bentley, Wichita, Kansas.

Kingston & Pembroke.—At the annual meeting in Kingston, Ont., Feb. 10, the following directors were chosen: D. W. Folger, C. Gildersleeve, G. A. Kirkpatrick, W. Nichol, J. W. Swift, Kingston, Ont; J. Munson, Watertown, N. Y.; H. H. Porter, Chicago; J. D. Flower, Roswell P. Flower, New York. The board elected C. Gildersleeve President; Roswell P. Flower, Vice-President.

Lehigh Coal & Navigation Co.—At the annual meeting in Philadelphia, Feb. 23, the following were elected: President, Joseph S. Harris; Vice-President, Francis C. Yarnall; managers, Edward W. Clark, Francis R. Cope, Fisher Hazard, Charles Parrish, James M. Willcox, Edward Lewis, T. Charlton Henry, Samuel Dickson, Edward B. Leisenring, Abram S. Hewitt.

Missouri Pacific.—The following circular from Superintendent E. K. Sibley is dated Sedalia, Mo., Feb. 8: "Mr. T. W. Newell is appointed Master Mechanic of the Missouri, Kansas & Texas Railway and branches (north of Denison), vice W. F. Smith, resigned, with headquarters at Parsons, Kan. His jurisdiction will commence at the north switch at Denison, Tex. Appointment to take effect Feb. 8. His orders will be respected accordingly."

Mobile & Ohio.—Vice-President and General Manager Talcott issues the following, dated St. Louis, Feb. 9: "The following organization for conducting the business of the St. Louis & Cairo Railroad will take effect from date: Mr. Charles Hamilton, Superintendent, will take charge of the maintenance and operation of the road and branches. Mr. Geo. Layet, Comptroller, will take charge of the accounting department, assisted by W. W. Booream, Auditor. Mr. C. J. Waller, General Freight and Passenger Agent, will take charge of the freight and passenger traffic, Mr. Geo. S. Pearce, Cashier, will perform the duties of that office, under the direction of the Superintendent. All other officers and agents will continue to perform their duties as heretofore, in accordance with the rules and regulations of the St Louis & Cairo Railroad, as heretofore operated, and instructions from the heads of the several departments. Mr. J. G. Motley will have charge of the work of reconstructing the road, for account of the St. Louis & Cairo Railroad Co., as Chief Engineer, and will make all necessary preparations therefor, and push to as early completion as practicable the widening of the road-bed, the renewal of structures and the relaying of the track to standard gauge. All officers and agents of this company will co-operate with the Chief Engineer and his assistants to facilitate the work, and his passes for persons in or working for his department and his requisitions for transportation of material will be respected."

New York & Sea Beach.—Mr. O. R. Whitney is appointed Master Mechanic. He was recently on the West Shore road.

Northern Adirondack Extension.—The directors of this new company are: A. F. Barlow, Wm. C. Benedict, A. B. Conklin, Charles F. Ketchum, Wm. C. Kellogg, Edward W. Lewis, George Munger, Samuel C. Trubee, Wm. M. Terry, Brooklyn, N. Y.; L. B. Bonnell, H. G. French, Walter Mason, Theodore V. Sand, New York.

Ohio & Northwestern.—The officers of this new company are: President, H. C. Parsons, Richmond, Va.; Treasurer, J. S. Wells, New York; Consulting Engineer, H. D. Whitcomb, Richmond, Va.; Counsel, W. A. Hutchins, Portsmouth, Ohio.

Paris & Great Northern.—Mr. Samuel Wright is President of this company. Mr. J. F. Hinkley, late of Kansas City, has been appointed Chief Engineer. Office in Paris, Texas.

Pittsburgh, Cleveland & Toledo.—At the annual meeting in Youngstown, O., Feb. 17, the following directors were chosen: C. H. Andrews, L. E. Cochran, W. J. Hitchcock, W. J. McKinnie, James Callery, Thomas M. King, G. J. Foreacre, William McCreery, J. H. Collins, H. W. Oliver, Orlando Smith, John McCleves. The directors elected C. H. Andrews President; H. W. Calvin, Secretary and Treasurer; J. B. Washington, Auditor. The road is leased to the Pittsburgh & Western.

St. John Bridge & Railway Extension Co.—At the recent annual meeting in St. John the following directors were chosen: F. E. Barker, F. W. Cram, M. R. Jones, James Murray Kay, J. H. Parks, W. H. Thorne, St. John, N. B.; Payson Tucker, Portland, Me. The board elected F. E. Barker President; J. H. Parks, Vice-President; Barclay Robinson, Secretary-Treasurer.

St. Louis, Kansas City & Colorado.—The officers of this company are: President, Francis Tiernan, St. Louis; Vice-President, E. R. Stewart, pringfield, O.; Treasurer, W. Chenault, Fort Scott, Kan.; Chief Engineer, S. T. Emerson, St. Louis.

San Antonio & Aransas Pass.—Mr. B. F. Yoakum, Secretary, has been chosen Treasurer also in place of D. Sullivan, resigned.

Sioux City & Des Moines.—The officers of this new company are: President, John Pierce; Vice-President, T. P. Gere; Secretary, F. C. Hills; Treasurer, A. S. Garretson; Chief Engineer, L. F. Wakefield. Office in Sioux City, Iowa.

Sleeping Car Conductors' Mutual Aid Association.—The officers are as follows: President, Robert C. Herbert, Pullman Co.; First Vice-President, W. H. Leak, New York Central Co.; Second Vice-President, Wm. B. Booz, Baltimore & Ohio; Secretary and Treasurer, S. W. Riley, Woodruff Co.; directors, W. K. Tublin, R. T. Cross, H. W. Crusey, John Salt, E. P. Valentine.

Stevens Point, Wausau & Northern.—The incorporators of this new company are G. C. Hixon, B. E. Edwards, W. W. Cargill, J. B. Canterbury and J. L. Pettingill, all of La Crosse, Wisconsin.

Willmar & Sioux Falls.—The directors of this new company are: John M. Spicer, George H. Perkins, Willmar, Minn.; C. B. Tyler, Marshall, Minn.; D. E. Sweet, C. C. Goodman, Pipestone, Minn.; H. T. Carson, E. A. Sherman, Sioux Falls, Dakota.

Zanesville & Newcomerstown.—The directors of this new company are Charles H. Abbot, Benjamin Wheeler, Willis Bailey, Edward Spencer and Edmund Turner, all of Zanesville, Ohio.

PERSONAL.

—Mr. John P. Roach has resigned his position as Assistant Superintendent of the dining car service of the New York Central & Hudson River road, and will engage in other business.

—Mr. William H. Fenner, well known from his connection with the Rhode Island Locomotive Works, has accepted the position of president of the Allen Paper Car Wheel Co., and will have his office in this city.

—Mr. W. A. Huston has resigned his position as Roadmaster of the Little Miami Division of the Pittsburgh, Cincinnati & St. Louis road. The employés in his department presented him with a handsome diamond stud as a testimonial of their esteem.

—Mr. Slater, for 18 years the Station master at St. Pancras (London), died on Jan. 29, at the early age of 44. Mr. Slater was well known to Americans traveling in England, and by his tact and urbanity did much to facilitate the introduction of two American enterprises, the Westinghouse brake and the Pullman car.

—Mr. Franklin Wright died at his residence near Petersburg, Va., Feb. 16, after a long illness. Mr. Wright was born in Pennsylvania and was employed as assistant engineer on several of the older lines in that state. In 1850 he went to Virginia, where he had charge of the survey and construction of the South Side road, from Petersburg to Lynchburg, now a part of the Norfolk & Western. He was subsequently engaged on other Southern lines, but in 1870 settled down on his farm near Petersburg, where he has since resided.

—Hon. Henry N. Walker, for many years a prominent citizen and lawyer of Detroit, died in that city Feb. 24, aged 73 years. He was born in Chautauqua County, N. Y., but went to Detroit in 1835. He was chosen Attorney General of the state in 1843, and while holding that office took a leading part in securing the sale of the Michigan Central road, which was originally owned by the state. Later he was one of the incorporators of the Detroit & Milwaukee Co., of which he was a director for a number of years and President from 1858 to 1863. For a number of years he was chief owner of the Detroit *Free Press*. Mr. Walker was highly esteemed for his public spirit and strict integrity.

—Mr. Louis Neale Whittle died in Macon, Ga., Feb. 17, aged 67 years. Mr. Whittle was born in Virginia, but went to Georgia nearly fifty years ago, where he was for some time employed as assistant civil engineer. Subsequently he studied law and was a number of years a prominent member of the Georgia bar. Mr. Whittle was a director and afterward President of the Monroe Railroad Co., which first began the construction of the line from Macon to Atlanta afterward known as the Macon & Western and now a part of the Central Railroad of Georgia. When this company was reorganized as the Macon & Western, he served for a number of years as a director of the new company. He was also one of the projectors of the Macon & Brunswick road and served for some time as a director and attorney of the company.

—Mr. Edward Learned, one of the most prominent citizens of Berkshire County, died at his home in Pittsfield, Mass., Feb. 19, at the age of 66. He was well known as a civil engineer and railroad contractor. He was a native of Watervliet, N. Y. He was employed with his father on the Boston Water Works in 1844–47 and on the Brookline tunnel. He was in the Massachusetts Senate two years and was distinguished in this capacity as chief on the Hoosac Tunnel Committee with Charles Hale, and for the preparation of a plan for a through line to the West to utilize the tunnel. The scheme was opposed by Hon. F. B. Hayes, and was defeated by the celebrated toll-gate bill. He was for a long time President of the Silver Islet Mining Co., and was interested in iron mining in the Northwest. He was a brother-in-law of John B. Jervis, the celebrated engineer of the Erie road and the Ohio & Mississippi, and was mainly instrumental in consolidating the several divisions of the latter. He was at one time largely interested with H. H. Boody and Sidney Dillon, the great railroad contractors. He was of great service to the country during the rebellion, and after the war assisted in the development of the Tehuantepec Railroad project in Mexico. He was a man of eminently social disposition and a pleasing public speaker.

—The following obituary of Mr. E. B. Talcott, whose death was briefly noted last week, is taken from *Engineering News:* "Edward Benton Talcott, Civil Engineer, and formerly Superintendent of the Galena & Chicago Union Railroad, now the Galena Division of the Chicago & Northwestern, died in Chi-

cago, Feb. 8, at the age of 74. Mr. Talcott was born at Rome, N. Y., but became a resident of Chicago in 1835. At 23 years of age he was one of the leading engineers on the Illinois & Michigan Canal, and he inaugurated the construction at Canalport by throwing out the first shovelful of dirt. As Engineer and Superintendent he was engaged on the canal until three years after its completion, except the years between 1840 and 1845, when the work was suspended. Mr. Talcott was City Surveyor of Chicago for a term, and in that capacity platted the submerged lands along the lake shore and the dock property along the river, as well as other sections of the city. He was next engaged for several years in the construction of the Hannibal & St. Joseph Railroad, and after its completion he returned to Chicago to become the first Superintendent of the Galena & Chicago Union Railroad, remaining in charge of its affairs until it was absorbed by the Chicago & Northwestern. During this time he constructed the bridge at Clinton, one of the first to be thrown across the Mississippi River. In 1867 he took charge of the construction of the Grand Rapids & Indiana Railroad, and, though many difficulties and discouragements arose, under which almost any other man would have succumbed, his courage never failed him, and he steadily preserved, until he finally saw it completed. The exposures and hardships to which he was subjected in carrying this line through the almost impenetrable swamps and forests of Northern Michigan undermined his naturally vigorous constitution, and in 1873 he was attacked with palsy, from which he was never afterward relieved. Since that time he has lived quietly at his home, constantly suffering, but never complaining. Although not seen in active life, he never lost his interest in matters of public importance, and kept himself fully informed as to the progress of all great engineering works. He followed every detail of the construction of the cantilever bridge at Niagara Falls, and carefully watched the progress of every work in which Chicago was interested. Although shaken by the palsy for 13 years, without cessation by night or day, and notwithstanding the fact that he was in constant pain, he never lost his cheerfulness, and never was heard to complain. An indomitable will and calm and steady courage enabled him to bear unflinchingly all that he was called upon to endure."

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Month of January:	1886.	1885.	Inc. or Dec.	P.c.
Ala. Gt. South...	$94,152	$104,791	D. $10,639	10.1
Cin., N. O. & T. P.	199,865	201,647	D. 1,782	0.9
Den. & R. G. W.	66,970	67,041	D. 71	0.1
Des. M. & Ft. D.	19,394	25,211	D. 5,817	23.2
Ft. Worth & D..	24,650	22,718	I. 1,932	8.4
Georgia Pacific..	60,902	60,180	I. 722	1.2
Grand Trunk.....	1,011,637	1,113,621	D. 101,984	9.2
Mexican National	122,233	126,662	D. 4,429	2.4
Mobile & Ohio...	166,805	201,681	D. 34,876	17.3
Net earnings...	42,355	56,536	D. 14,181	26.6
Nash., C. & St. L.	185,519	184,986	I. 533	0.3
Net earnings...	72,752	78,889	D. 6,137	7.7
N. O. & Nor'east.	62,702	57,861	I. 4,841	8.2
Pennsylvania.....	3,421,536	3,277,522	I. 144,014	4.4
Net earnings...	946,541	985,577	D. 39,033	4.0
Vicks. & Mer....	47,245	42,281	I. 4 964	11.8
Vick , Shre. & P.	42,207	30,539	I. 11,668	38.2
Second week in February:				
Buff., R. & Pitts.	$25,604	$18,261	I. $7,343	40.6
Canadian Pacific.	111,000	92,000	I. 19,000	20.6
Chi. & Alton.....	148,390	146,799	I. 1,591	1.1
Chi. & Nor'west.	396,300	228,600	I. 167,700	73.2
Ch..St. P., M. & O.	91,600	71,200	I. 20,400	28.7
C., I., St. L. & C..	53,259	43,000	I. 10,259	23.9
Denver & R. G ...	111,086	98.826	I. 12.260	12.4
Illinois Central..	245,000	203,033	I. 41,967	20.8
Iowa lines.....	37,400	21,424	I. 15,976	74 7
Long Island.....	36,722	32,736	I. 3,986	12.1
Louisv. & Nashv.	279,765	257,575	I. 22,190	8.7
Mil. & Northern.	11.375	8,615	I. 2,760	32.1
St. P. & Duluth.	19,389	14 202	I. 5,187	37.0
Third week in February:				
Chi., Mil. & St. P.	$366,000	$297,566	I. $68,434	22.8
Chi. & East. Ill..	30,011	16.795	I. 13 216	78.7
St. L. & San F...	76,800	74,300	I. 3,400	4.6
Year ending Dec. 31:	1885.	1884.		
Ches. & Ohio....	$3,361,235	$3,538.605	D. $177,370	5.0
Net earnings...	987,075	1.075 885	D. 88,810	8.2
Ches , O. & S. W.	1,571,155	1,374.645	I. 196,510	14.3
Net earnings...	502,530	339.951	I. 162,569	47.8
Chi., Bur. & Q....	26,556,425	25,483,612	I. 1,072,813	4.2
Net earnings...	12,663,602	12,411.108	I. 252,494	2.0
Eliz., Lex. & B. S.	706,467	762,627	D. 56,160	7.4
Net earnings..	253,400	258,052	D. 4,652	1.8
Gal , H. & S. An.	3,236,641	2,901,591	I. 335.050	11.6
Net earnings...	1,545,396	922,830	I. 622,566	67.4
Louisiana West..	627,317	485,709	I. 141,608	29 1
Net earnings...	343,445	216.547	I. 126,898	58.5
Morgan's La. & T.	4,205,451	3,629,006	I. 576,445	15.9
Net earnings...	1,551,086	1,163,139	I. 387,947	33.4
N. Y., Texas & Mex	96,709	.....	... ..	....
Net earnings...	33,718	.....	.....	....
Oregon Imp. Co..	2,866,060	3,370,762	D. 504,702	15.0
Tex. & N. Orl'ns.	1,017,618	872.140	I. 145,478	16.7
Net earnings...	487,201	355.519	I. 131,682	37.1
Tol., Ann A. & N. Mich	299,517	253,581	I. 45,936	18.1
Month of December:				
Ches. & Ohio....	$314.195	$308,912	I. $5,283	1.7
Net earnings..	110,235	104,272	I. 5,963	5.7
Ches., O. & S. W.	147,586	138,278	I. 9.308	6.7
Net earnings...	46,142	38,134	I. 8.008	21.1
Chi., Bur. & Q....	2,329,975	2,060,299	I. 269,676	13.1
Net earnings...	1,297.167	1,044,022	I. 253,145	24.2
Eliz., Lex. & B. S.	57,732	65,584	D. 7,852	11.9
Net earnings...	22,666	20,640	I. 1,426	6 8
Gal., H. & S. An..	333,674	283,152	I. 50,522	17.8
Net earnings...	167,654	126,614	I. 41.040	32..3
Louisiana West..	78,646	60,992	I. 17,654	29.0
Net earnings..	53.006	32,789	I. 20,217	61.3
Morgan's La. & T.	484,909	472,937	I. 11,972	2.5
Net earnings ..	258,856	194,636	I. 64,170	32.9
N. Y., Texas & Mex...	21,687	....	.....	...
Net earnings..	6,331	.....	.....	...
Oregon Imp. Co..	211,094	228,192	D. 17,098	7.5
Net earnings..	29,472	43,698	D. 14,226	32.3
Tex. & N. Orl'ns.	125,386	95,753	I. 29,633	31.0
Net earnings...	78,363	51,970	I. 26,393	50.8

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Coal.

Coal tonnages for the week ending Feb. 13 are reported as follows:

	1886.	1885.	Inc. or Dec.	P.c.
Anthracite	618,877	430,988	I. 187,889	43.4
Eastern bituminous.....	177,658	154,417	I. 23,241	15.1
Coke	24,148	48,143	D. 23,995	49.9

The demand for anthracite coal is fair, but there are reports of general cutting in prices. The present prospect is that large shipments and low prices will continue for a time.

Bituminous coal shipments are also large, but there will probably be some decrease as the new pool gets into working order.

Coal tonnage passing over the Northern Central road for the year ending Dec. 31 was:

	1885.	1884.	Increase.	P. c.
Anthracite.. 3,201,502		2.723,177	478,325	17.6
Bituminous... ....1.289,119		1 033,516	255,603	24.7
Total..... 4,490,621		3,756,693	733,928	19.5

The tonnage carried to Baltimore last year was 790,809 against 697,781 in 1884, an increase of 93,028 tons, or 13.3 per cent.

Shipments of coal from the mines on the Monongahela River above Pittsburgh in January were 6,658,100 bushels. Coke shipments were 117,000 bushels.

A dispatch from Philadelphia to the Buffalo *Express* says: "The officers of the Buffalo, New York & Philadelphia Railroad Co. state that they have united in the pool with all the coal companies of Buffalo, excepting the Rochester & Pittsburgh. The coals are to be sold at figures which will enable them to compete with and secure the trade of the Rochester & Pittsburgh Railroad. In order to do this the coals may have to be carried by their road at very low rates of freight, and possibly at a loss, for a limited time, but they are willing to do this in order that they may establish better prices for coal in Buffalo and derive some benefit therefrom in the future."

The coal tonnage of the Chicago & Alton Railroad for the year ending Dec. 31 last was 1,390.855 tons, against 1,278,320 in 1884; an increase of 112,535 tons, or 8.8 per cent.

Pennsylvania Railroad coal tonnage for the week ending Feb. 20 was:

	Coal.	Coke.	Total.	1885.
Line of road	179 878	24.493	204,371	170,513
From other lines.....	99,544	1,177	100.721	57,603
Total....	279,422	25,670	305,092	228,116
Year to Feb. 20.....	1,667,409	297,262	1,964,671	1,664,111

Increase for the week, 76,976 tons, or 33.8 per cent.; increase for the year, 300,560 tons, or 18.1 per cent.

Cumberland coal shipments for the week ending Feb. 20 were 33,788 tons. Total to Feb. 20 this year, 259,361; last year, 246,405; increase, 12,956 tons, or 5.3 per cent.

Central Iowa Traffic.

The earnings of the Central Iowa Traffic Association for the month of January were as follows:

WEST-BOUND TRAFFIC.

	1886.			1885.
		Per cents.		
Road.	Revenue.	Act'l.	Al'td.	Revenue.
C., R. I. & P.....	$10.743.88	39	40	$13,038.25
C. & N. W.....	3,867.80	14	15	2,893.77
C., B. & Q.....	2,323.57	8	15	2,194.47
C., M. & St. P.....	2.545.11	9	15	1,558.00
W., St. L. & P.....	8,186.61	30	15	2,893.98
Total.....	$27,666.97	100	100	$.2,578.47

EAST-BOUND TRAFFIC.

	1886.			1885.
		Per cents		
Road.	Revenue.	Act'l.	Al'td.	Revenue.
C., R. I. & P..... ...	$972.38	52	40	$984.60
C. & N W.....	354.85	19	15	639.91
C., B. & Q.....	383.25	20	15	391.53
C., M. & St. P....	74.88	4	15	98.12
W , St. L. & P.	95.85	5	15	495.67
Total..... . . .	$1,881.21	100	100	$2,609.83

The west-bound tonnage amounted to 4,510 tons, against 3,667 tons in January, 1885. The east-bound tonnage amounted to 291 tons, against 430 tons in January, 1885.

Petroleum.

Production and shipments of the Pennsylvania and New York oil wells in January are given by *Stowell's Petroleum Reporter* as follows, in barrels of 42 gallons:

	1886.	1885.	Inc. or Dec.	P.c.
Production.....	1,748.958	1.652,176	I. 96,782	5.9
Shipments.	1,991,561	1,804.028	I. 187,533	10.4
Stock, Jan. 31.....	34, 86,238	37.214.274	D. 3,028,036	8 1
Producing wells.....	23,699	21,950	I.	...

The production was less than in any month since August last. Of the total the Allegheny District furnished 9.1 per cent.; the Bradford District, 35.6; the Middle District, 13.4 and the Lower District 41.9 per cent. Stock on hand decreased 242,603 barrels during the month, that being the excess of shipments over production.

The shipments for the month were divided as follows:

	Crude.	Refined.	Total.	P. c.
New York.....	553,313	99,002	652.315	32.8
Philadelphia.....	515,772	104,626	620.398	31.1
Baltimore	68,572	7,721	76.293	3.8
Boston.....	16 639	80,158	96,797	4.9
Cleveland.....	222,495	... .	222.495	11.2
Pittsburgh.....	42,231	.....	42.231	2.1
Local points	194,839	86,193	281,032	14.1
Total.....	1,613,861	377,700	1,991,561	100.0

In this table the refined oil is that refined at creek refineries; it is reduced to its equivalent in crude, so that the total represents the amount of crude oil shipped to each point named, whether in crude or in refined form.

Transcontinental Rates.

The final disagreement at the meeting of the Transcontinental Association has been followed by open hostilities and a general cutting of both freight and passenger rates to Pacific Coast points. The reduction in freight rates is understood to be general, but the actual rates made have not been widely announced. At latest dates passenger rates from the Missouri River points had fallen to $30 first-class and $20 second-class, the old rates being $90 and $45. The rates named were reached by successive reductions in less than a week.

Central Traffic Association.

A meeting of the Central Traffic Association, Passenger Department, was held at the Grand Pacific Hotel, Chicago, Feb. 18. After a lengthy and interesting address by Commissioner Blanchard, in which he called attention to the fact that it was desired to amalgamate the central passenger agreement with the west-bound trunk line agreement, he and Secretary George H. Daniels were authorized to prepare such an agreement. The two gentlemen then carefully examined the trunk line agreement and the Cincinnati agreement, selecting such portions for their own use as were the most useful. There were 48 articles to be considered. It is distinctly understood that the Central Traffic Association, passenger department, and the Central Passenger Committee are to be kept distinct, for the latter has many north and south lines that would be useless in the other associations, while the first-named has members that would not join the Central Passenger Committee.

Iowa State Passenger Association.

The preliminary steps toward the formation of an association to embrace all of the lines interested in passenger traffic within the boundaries of the state of Iowa were taken at a meeting of general passenger agents held in Chicago last week. The object of the association is to govern and protect passenger rates to local points throughout Iowa. A full representation responded to the call, and the greater part of the time was devoted to discussing a form of agreement. A committee composed of J. P. Nourse of the Central Iowa, E. St. John of the Chicago, Rock Island & Pacific, Percival Lowell of the Chicago, Burlington & Quincy, and J. E. Hannigan of the Burlington, Cedar Rapids and Northern, was instructed to prepare a constitution and by-laws.

The meeting continued on the following day, when it was resolved to form the Iowa State Passenger Association, with the following officers: Chairman, J. P. Nourse; Secretary, J. E. Hannigan; Executive Committee, George W. Ogilvie, W. T. Black and W. A. Thrall. All this is conditional on the willingness of certain lines that were not represented to join the Association, which will be similar in most respects to the Michigan Passenger Association. Another meeting will be held at Des Moines on March 25.

Central Passenger Committee.

A meeting was held in Cleveland, O., Feb. 17, at which the new articles of agreement were considered, but not finally adopted.

Flour Rates from Minneapolis.

A dispatch from St. Paul, Minn., Feb. 17, says: "The reduction in the flour rate to Chicago from 17½ cents to 15 cents, which went into effect yesterday on the Chicago, St. Paul, Minneapolis & Omaha is supplemented to-day by the announcement that the Omaha has reduced the transit rate from Minneapolis to Chicago to 12 cents. Whether these moves will have the desired effect of increasing business, holding shipments to the transit system, and keeping the new lines from getting the cream of the business remains to be seen. The fact that in spite of the reduction Milwaukee transit is selling for 11⅞, or a figure less than the basis, tends to a belief that the end of the drop is not yet."

Western Freight Association.

The business done by the lines in the Western Freight Association during January is shown in the following statements:

THROUGH FREIGHT POOL.

	Revenue	
Lines.	West-bound.	East-bound.
C., M. & St. P.....	$2.984	$16.776
C., R. I & P	6,683	12,377
W., St. L. & P.....	3,514	39,544
C., B. & Q.....	12,169	15,896
C. & N. W.....	9,017	2,033
Totals.....	$34,069	$85,628

OMAHA, COUNCIL BLUFFS AND PAPILLION POOL.

Lines.	West-bound.	East-bound.
C., B. & Q.....	$28,266	$11,713
C., M. & St. P.....	6,134	10,153
C. & N. W.....	14,389	643
C., R. I. & P.....	21,709	3,047
W., St. L. & P.....	9,321	1,557
Totals...	$79,881	$27,115

The Burlington and the Northwestern were short in their proportions, the other lines over.

Southwestern Railway Association.

Commissioner Midgley, on behalf of the Southwestern Railway Association, in reply to the requests made by committees from St. Louis and Kansas City to the effect that rates between Mississippi River points and Missouri River points be made 60 per cent. of the rates current between Chicago and Missouri River points, and that such rates be made the same as govern traffic between Chicago and St. Paul, concludes as follows: "The rates enforced by the Southwestern Association on business to and from the Missouri River in no case exceed the rate per ton per mile on like shipments carried between interior points in Missouri and Iowa and points on and east of the Mississippi River; while in some instances the rates to and from the Southwest are less than those enforced on similar business from points located considerably east of the Missouri River. In no respect do the Missouri River points suffer in comparison with other sections reached by the Southwestern roads. That being the case, it is not apparent how any just complaint can be urged against the existing rates and classification."

The Disposition to Maintain Rates.

It must be acknowledged that the hand that has been laid upon the general freight and contracting agents at this point for the last three months has been sternly repressive. Under ordinary circumstances, and with the pressure that has been brought to bear by outside disturbing influences, rates before the existence of the trunk-line contract would have gone to pieces half a dozen times. The conditions leading up to former breaks have been repeated, commencing with suspicious increases of traffic on the part of a competitor, a sharp scrutiny of freight transactions, a verification of suspicions satisfactory to the investigator, a hasty communication by telegraph with the President of the road, a return authorization to retaliate, and the war was on hand. Now all of this is changed. The General Freight Agent goes through his programme as of yore, but his work does not meet with the same results. He has no trouble in getting at as many proofs as he did six months ago, and he presents them just as logically and with as much force as then, but the President is strangely difficult to convince. Instead of flashing back a message to meet the cut, the superior official merely lays the accumulated evidence before Commissioner Fink, and asks that the offender be reasoned with and held in mild restraint. Then the presidents get together in New York, talk the matter over privately among themselves, and give out the information that the reports of rate-cutting at Chicago have been greatly exaggerated, and that the roads out this way are all members of a happy family living and doing business together in peace and harmony. All of which goes to prove that it will take a great deal of provocation to start a rate war, and that any serious disturbance is to be avoided at all hazards. The reasons for this determination do not lie very deep and need no great amount of astuteness to understand. The situation is very different from what obtained last year, when a contest was waged to bankrupt a rival competitor and the fight kept up purposely to the point of exhaustion. One great deal has been accomplished, another and more gigantic one has been undertaken, and in order to bear the burdens already shouldered, and those that are to be taken up, peace is a necessary element, and little irregularities will be winked at and disputes kept in the background until the deal is carried out or a failure recorded.—*Chicago Times, Feb.* 17.

Cotton.

Cotton movement for the week ending Feb. 19 is reported as follows, in bales:

	1886.	1885.	Inc. or Dec.	P. c.
Interior markets:				
Receipts....	57,853	21,169	I. 29,684	123.6
Shipments....	63.799	45,983	I. 17,816	38.7
Stock, Feb 19..	448,170	234.231	I. 213,939	91.4
Seaports:				
Receipts.	102.524	54,324	I. 48,200	89.1
Exports	55,524	60,041	I. 25.483	42.5
Stock, Feb. 19 .....1,042.354		830,055	I. 212,299	25.6

The total movement from plantations for the crop year (from Sept. 1) to Feb. 19 is estimated at 5,599,499 bales, against 5,143,216 last year, 5,063,696 in 1883–84, and 5,703,652 bales in 1882–83.

The New Rates on Live Stock and Dressed Meats.

The circular from Mr. Fink's office announcing the change in these rates was issued Feb. 18, and reads as follows:

"At a meeting of the Trunk Line Executive Committee, acting as the Standing Committee, the tariff rates on live

stock and dressed meats were under consideration, and with the testimony regarding the subject before them, it was unanimously

"*Resolved*, That, taking effect March 1, 1886, the rates on live stock and dressed meats will be on the following basis:

Chicago to New York:

Live sheep, car loads	45 cents per 100 lbs.
Dressed sheep, car loads, in refrigerator cars	90 " " "
Live hogs, car loads	30 " " "
Dressed hogs, car loads, in refrigerator cars	55 " " "
Dressed hogs, car loads, in common cars	50 " " "

When loaded with dressed beef the rates will be as follows:

"On whole hogs, 55 cents; on cut-up hogs, same as dressed beef; on dressed sheep, 90 cents.

"The Committee further agreed that the rates on cattle should be on the basis of 35 cents per 100 lbs., taking effect same date.

"As the Committee could not agree upon the dressed beef rate, that question was submitted to the Commissioner, who decided that the rates on dressed beef should be on the basis of 65 cents per 100 lbs., and the Committee agreed to put said rate into effect on March 1.

"It was further agreed that the rates above named shall be charged until official announcement of changes in tariffs are made, and that hereafter the rates on the dressed meats and live stock shall not be established on a fixed percentage basis, but shall be determined for each article separately from time to time, and no rebates shall be allowed from the published rates. N. GUILFORD, Vice-Chairman.

"C. W. BULLEN, Secretary."

RAILROAD LAW.

New Jersey Railroad Taxation.

In Trenton, N. J., Feb. 18, the New Jersey Supreme Court rendered its decision in the case of the State against 21 railroads that had certioraried the taxes imposed upon them under the Railroad Tax act of 1884, which created the State Board of Assessors, and levied a state tax of 0½ per cent. on the property of railroads. The decision declares the act to be unconstitutional and void, on the ground that it imposes a state tax on the property of railroad companies to the exclusion of other real estate in the state. This, declares the Court, is not levying taxes by general laws, for the mere fact that it imposes a tax on the real property of a railroad company, and exempts the property of individuals from the payment of a state tax, makes the law special and not general, and therefore against the spirit of the constitution.

In delivering his opinion, Chief Justice Beasley said:

"The fourteenth amendment of the United States Constitution distinctly provides for equality in the matter of property, and the state constitution is equally explicit on this point. There must be absolute justice along with the general laws, uniform rules and true valuation. This does not prevent the classification of homogeneous property, nor does it prohibit the grouping of a different class of property for taxable purposes; but this classification must be based on the nature of the property itself, and on nothing else. No legislative fiat can create a classification. Furthermore, a part of a class only is taxed by this law. This selection of railroad and canal property from all other corporate property is evidently an isolation, and an especial enactment, and, consequently, unconstitutional. If this railroad property could be so set aside, as the law provides, in order that it may bear all the burden of state legislation, so also might the pottery interests of Trenton be made to bear the entire municipal tax of that city. The Court appreciates the serious embarrassment which will ensue to the state in declaring this act void, but justice demands such a decision."

The Court incidentally referred to the special charters which the Erie, the Delaware, Lackawanna & Western and several other roads set up in defense, and indicated that it would sustain those charters. It was also indicated that the Court sustained the right of the state to tax the franchise of a railroad company.

The case will be carried up to the Court of Errors on appeal.

OLD AND NEW ROADS

Bay City, Caro & Port Huron.—This company has been organized to build a railroad from Bay City, Mich., east by south to Port Huron, a distance of about 90 miles. The projected line will be somewhat to the northward of the Port Huron & Northwestern, but not very far from it.

Bedford & Bloomfield.—It is stated that this road, which has been for some time past owned by the Indianapolis Rolling Mill Co., has been sold to the Louisville, New Albany & Chicago Co., the price not being stated. The line is of 3 ft. gauge and extends from Bedford, Ind., westward to Switz City, a distance of 42 miles. It was sold under foreclosure some three years ago and was then bought in by the Indianapolis Rolling Mill Co., which held nearly all the bonds and which has since owned the line. The road has some business in coal and has considerable freight from stone quarries along the line.

Blue Spring, Orange City & Atlantic.—Track on this road is now laid from Blue Spring, Fla., on the St. Johns River, to Lake Helen, a distance of 8 miles, and trains will shortly be put on. Grading is in progress on 20 miles more, from Lake Helen to New Smyrna, and the company hopes to have the line completed by April next.

Boston & New York Air Line.—The Connecticut Supreme Court has filed its opinion in the suit of Gates against this company, which was brought to set aside the foreclosure of the mortgages on the New Haven, Middletown and Willimantic road, under which the line was transferred to the present company, and the suit, if successful, would have had the effect of setting aside the lease to the New York, New Haven & Hartford Co. The decision of the Court sustains the foreclosure, and holds that the present company was legally organized, and is properly in possession of the road. The plan of foreclosure and reorganization was sustained both by the Court and the Legislature, and this action is held to bind the plaintiff, although he did not know of it until after the foreclosure was completed and left him on even terms with the other bondholders, and entitled to receive preferred stock for his former bonds on the same terms with them. The Court also holds that it was not necessary for him to appear personally in the original foreclosure suit, as the interests of all the bondholders were represented in the foreclosure suit by the State Treasurer acting as trustee.

Buffalo, Rochester & Pittsburgh.—The report to the New York Railroad Commission for the quarter ending Dec. 31 is as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Earnings	$344,284	$311,947	I. $32,337	10.4
Expenses	241,402	202,632	I. 38,770	19.1
Net earnings	$102,882	$109,315	D. $6,433	5.9
Charges	108,233	164,453	D. 56,220	34.2
Deficit	$5,351	$55,138	D. $49,787	90.5

Charges include interest, rentals and taxes, giving the proportion for the quarter. The decrease in the amount this year is due to the reorganization of the company.

Burlington, Cedar Rapids & Northern.—This company has agreed to build a branch from its Northern Division at Little Rock, Ia., westward to Sioux City, Dak., a distance of about 55 miles. The towns along the line agreed to give the right of way, and, in addition, a cash bonus of $80,000.

Canadian Pacific.—This company has just completed a grain elevator on Montreal Harbor which has a storage capacity of 600,000 bushels and can, it is said, transfer 100,000 bushels a day from the cars to the steamers. The building is 210 by 80 ft. and 160 ft. in height, and rests upon piles.

Chicago, Burlington & Northern.—This company's bridge over the Galena River near Galena, Ill., is completed, and track has been laid across it. The bridge has 3 fixed spans of 200 ft. each and a draw-span 200 ft. long.

Chicago, Burlington & Quincy.—The statement for December and the year ending Dec. 31 is as follows:

	December.		Year.	
	1885.	1884.	1885.	1884.
Passengers	$425,578	$362,569	$5,286,408	$5,339,866
Freight	1,693,709	1,514,078	19,565,853	18,514,432
Mails, etc	210,688	183,652	1,704,164	1,629,315
Total	$2,329,975	$2,060,299	$26,556,425	$25,483,613
Expenses	1,032,808	1,016,277	13,892,823	13,072,505
Net earn	$1,297,167	$1,044,022	$12,663,602	$12,411,108
P. c. of exps.	44.3	49.3	52.3	51.3

For the year the gross earnings increased $1,072,812, or 4.2 per cent., and the expenses $820,318, or 6.3 per cent., leaving a gain of $252,494, or 2.0 per cent., in net earnings.

Chicago & Central Iowa.—This company has filed articles of incorporation to build a railroad from Keithsburg on the Mississippi River, eastward to Lacon, where it will connect with a branch of the Chicago and Alton road. The line is intended as an extension of the Central Iowa road and to secure for that road a direct connection with Chicago.

Chicago & Great Southern.—In Indianapolis, Feb. 9, in the United States Circuit Court, in the case of Porter against this company, a decree was made ordering the sale of the property. No bid of less than $500,000 will be entertained, and claims are to have precedence in the following order: Debts for labor and construction, $200,000; receiver's certificates, $153,000; bonds of the Porter syndicate, $1,200,000. The date of the sale was not fixed.

Chicago, Milwaukee & St. Paul.—This company is preparing to begin work on the extension of its branch from Red Wing to Northfield, Minn., from the last named place to Casota, and probably further west. The new line will pass through a very good country.

Chicago & Northwestern.—It is stated that this company will build this summer an extension of its Felch Mountain branch to Republic, Mich., in order to secure a part of the large tonnage of the Republic mines, which now goes over the Marquette, Houghton & Ontonagon road.

Surveys are now in progress for the extension of the company's line from Iron River, Mich., to the Gogebic range.

Chicago & Ohio River.—The board of directors of the Chicago & Ohio River Railroad Co., successor to the Danville, Olney & Ohio River Railroad Co., has called a meeting of the stockholders to be held at Danville, Vermillion County, Ill., on Wednesday, April 12, 1886, at noon. The purpose of the meeting is to authorize the issue of $500,000 par value first-mortgage bonds and $750,000 par value income bonds, and the execution of suitable mortgages upon the corporate property and franchises of the company securing said bonds. It is expected the road will be pushed forward to an early completion and the line extended to the Ohio River.

Dayton & Ironton.—Arrangements are now being made to change this road from 3 ft. to standard gauge, and it is thought that the change will be made during the coming summer.

Duluth & Iron Range.—This company will probably build this season the line of 27 miles from the present terminus at Two Harbors on Lake Superior, westward to Duluth, Minn. It is also reported that the company is having surveys made for a branch to leave the main line about 20 miles south of the northern terminus at Tower, and to run southwest directly to Duluth, the object of this branch being to open up the extensive lumber region between Vermilion Lake and Duluth, which is now almost uninhabited.

East Tennessee, Virginia & Georgia.—A number of the stockholders met in New York, Feb. 23, and appointed a committee (Messrs. Walter Bowne, Thomas Denny, Fleming Smith, T. J. Levy, Ernest Dichmauer and Albert Kelly) to examine the proposed plans of reorganization, and report to a meeting to be held shortly.

Evansville & Terre Haute.—The brakemen on this road struck, Feb. 20, for an increase of pay, the company having refused to grant their request. The freight traffic was entirely stopped for a short time, but on the same night, after a conference with a committee of the strikers, President Mackey agreed to grant the increase, and traffic was promptly resumed.

Ft. Scott Southern.—This company has been incorporated in Kansas to build a railroad from Ft. Scott, Kan., to Neosho, Mo., a distance of 90 miles.

Gulf, Colorado & Santa Fe.—It is stated that this company has finally decided to build the extension from Brownwood, Tex., to San Angelo instead of to Coleman. The company will also build a branch from Santa Ana, in Coleman County, westward to a point on the Colorado River, 4 miles south from Runnels, where a new town will be established, which will probably remain the terminus of this branch for some time.

Helena & Great Falls.—Contracts have been let for the grading of 40 miles of this road. The line is to extend from the Northern Pacific at Helena, Mont., to the great falls of the Missouri above Ft. Benton.

Illinois Central.—It will be remembered that this company last year successfully negotiated a loan of $1,500,000 on its consolidated mortgage, at 4 per cent. The company now offers $2,500,000 bonds under this mortgage, which are to bear only 3½ per cent. interest, which, we believe, is the lowest interest ever offered on a railroad bond in this country. There is no doubt, however, that the bonds will be taken, considering the high credit which the company has always had. The proceeds of these bonds will be used to retire $2,690,000 of 8 per cent. bonds on the Southern Division, which will mature July 1 next.

Jacksonville, Tampa & Key West.—Track on this new road is now laid to the southern terminus at Sanford, Fla., 3 miles beyond Enterprise Junction, 66 miles from Palatka and 122 miles from Jacksonville. Trains will run this week to the new terminus.

Kanawha & Ohio.—The purchasers of the River Division of the Ohio Central at foreclosure sale have conveyed the property, including the bridge over the Ohio River at Point Pleasant, to this new company and the reorganization will shortly be completed. The line conveyed extends from Corning, O., on the Toledo & Ohio Central road, to Charleston, W. Va., 115 miles.

Kansas City, Birmingham & Memphis.—This company has secured the passage of its charter through the Mississippi Legislature. The proposed line is to extend from Memphis, Tenn., to Birmingham, Ala., very nearly on the line projected for the Memphis, Birmingham & Atlantic road. It is understood that the project is supported by parties who are largely interested in the Kansas City, Fort Scott & Gulf and the Kansas City, Springfield & Memphis roads, and that the projected line is to be an extension of the last named road. The incorporators have promised that surveys for the road will be begun as soon as the charter is approved, and that work will be commenced as soon as the line is finally located.

Kansas & Memphis.—This company has filed articles of incorporation to build a railroad about 700 miles long, running from Oswego, Kan., through the Indian Territory to Benton, Ark., and thence to the Mississippi River opposite Memphis, Tenn., with a branch to Little Rock.

Lake Erie & Western.—The plan of reorganization has been issued and differs but little from the outline heretofore published. Messrs. Hollins, Read and Cary are appointed a purchasing committee to represent the holders of the first-mortgage bonds. The committee is to secure the foreclosure of the mortgages and to purchase the road for the bondholders.

The LaFayette, Bloomington & Muncie bonds and coupons will be exchanged for new first-mortage Western Division bonds, par for par. Lake Erie & Western first-mortgage bonds and coupons will be exchanged for new first-mortgage Eastern Division bonds, par for par, and new preferred stock at 20 per cent. of the face of the old bonds.

Sandusky Division first-mortgage bonds and coupons will be exchanged for new first-mortgage Eastern Division bonds equal to the matured interest of Feb. 1, 1886, on the old bonds, and to 80 per cent. of the par of the old bonds.

LaFayette, Bloomington & Muncie income bonds will be exchanged for preferred stock at 150 per cent. of the par of the old bonds.

Lake Erie & Western income bonds will receive 75 per cent. of the par in new preferred stock.

Sandusky Extension income bonds will receive 40 per cent. in preferred stock.

The old stock will be exchanged for new common stock par for par.

Lake Shore & Michigan Southern.—The statement to the New York Commission for the quarter ending Dec. 31 is as follows:

	1885.	1884.	Increase.	P.c.
Earnings	$3,970,942	$3,880,042	$90,900	2.3
Expenses	2,172,962	2,159,406	13,556	0.6
Net earnings	$1,797,980	$1,720,636	$77,344	4.5
Charges	1,126,764	1,073,345	53,419	5.0
Surplus	$671,216	$647,291	$23,925	3.7

Charges include interest, rentals, taxes and dividends on guaranteed stock; they show a considerable increase over last year.

Little Rock, Mississippi River & Texas.—A Little Rock dispatch says that on March 1 this road will be transferred to the control of John H. Reed and E. H. Winchester, trustees, for the bondholders. It is not expected that this transfer will cause any change in the management.

Louisville, New Albany & Chicago.—This company has bought the Bedford & Bloomfield road, as noted elsewhere, which will form a branch of its line extending from Bedford, Ind., west to Switz City, 42 miles. The gauge of the line thus purchased will be changed from 3-ft. to standard, and the new branch is expected to bring considerable local traffic to the road.

Manhattan.—The New York Elevated Co. is about to issue $1,000,000 in 5 per cent. debenture bonds. It is stated that these bonds are for the purpose of buying additional equipment and making required changes in stations. They will be obligations of the New York Elevated Railroad Co., and not of the Manhattan Co.

The suit of the New England Iron Co. to recover damages for alleged breach of contract on the part of the Metropolitan Elevated Co., which has been before the court in different forms for nearly 8 years past, is to be finally ended by a compromise, the Metropolitan Co. paying $250,000. The New England Iron Co. claims that it had an agreement to build the Metropolitan Elevated line at $250,000 per mile, but the company afterward repudiated this agreement and entered into another contract with the New York Loan & Improvement Co. for the building of the road.

Memphis, Birmingham & Atlantic.—Contracts have been let for the grading and bridging of the extension of this road from Holly Springs, Miss., to Tupelo, 60 miles, as follows: Cross ties for the entire distance to D. H. Pitts & Co., Scottsville, Va.; trestling and piling 33 miles to T. L. & C. J. Houser, of St. Louis; 27 miles to R. D. T. Lawrence, of Marietta, Ga.; grading 12 miles to E. P. Withers & Co., of Memphis, Tenn.; 11 miles to J. J. Cooney & Co., of Memphis; 8 miles to Wright & Co., of Richmond, Va.; 7 miles to A. & C. Wright, of Shelby, N. C.; 4 miles to E. Woodard, of New Orleans.

Milwaukee & Northern.—A contract has been let by this company to Dawson & Symmes, of Fort Howard, Wis., for the grading of an extension of the line from its present terminus at Pike River, Wis., northwest to Iron River, Mich., a distance of about 55 miles. The object of this extension is to secure a share of the iron ore traffic from the Iron River mines.

Minneapolis & St. Louis.—This company is making arrangements to extend its Wisconsin, Minnesota & Pacific line from its present terminus at Eagle Lake, Minn., to New Ulm.

Missouri Pacific.—The shopmen on the International & Great Northern Division struck on Feb. 20 and all work in the shops at Palestine, Tex., was stopped. On the following day, however, the matter was arranged, the officers of the road agreeing to sign a contract that in future no repair work should be sent to outside shops. The men claimed that cars and engines had been sent away from the road to be repaired in order to evade the agreement made last summer.

Contracts have been let for grading 77 miles of the proposed branch from the Iron Mountain line at Bald Knob, Ark., to Memphis. The contractors, all of whom are from Memphis, Tenn., are as follows: Clements & Kelley, 11 miles; Joseph Flynn, 10 miles; Purcell & Grace, 10 miles; J. C. Hartnett, 23 miles; Jenkins & Yerkle, 18 miles; J. S. Andrews, 5 miles.

Mobile & Ohio.—The gross and net earnings for January and from July 1 to Jan. 31 have been :

	January		Seven months.	
	1886.	1885.	1885–86.	1884–85.
Gross earnings	$166,805	$201,681	$1,307,189	$1,385,708
Operating expenses	124,450	145,145	864,662	927,381
Net earnings	$42,355	$56,536	$442,527	$458,327

For the seven months the gross earnings decreased $78,519, or 5.7 per cent., and the expenses $62,719, or 6.8 per cent., leaving a decrease of $15,800, or 3.4 per cent., in net earnings.

Nashville, Chattanooga & St. Louis.—The statement for January and the seven months of the fiscal year from July 1 to Jan. 31 is as follows :

	January.		Seven months.	
	1886.	1885.	1885–86.	1884–85.
Earnings	$185,519	$184,986	$1,292,829	$1,398,487
Expenses	112,767	106,097	772,018	794,960
Net earnings	$72,752	$78,889	$520,811	$603,527
Interest and taxes			394,291	399,741
Improvements			32,319	43,328
Total charges			$426,610	$443,069
Net surplus			$94,201	$160,458

For the seven months there was a decrease in gross earnings of $105,658, or 7.6 per cent.; a decrease in net earnings of $82,716, or 13.7 per cent., and a decrease of $66,257, or 41.4 per cent., in net surplus.

New York Central Sleeping Car Co.—For the quarter ending Dec. 31 this company's gross earnings were $406,228. The expenses were $293,557, leaving the net earnings $112,671.

New York, Ontario & Western.—The statement to the New York Railroad Commission for the quarter ending Dec. 31 is as follows :

	1885.	1884.	Inc. or Dec.	P. c.
Earnings	$481,574	$473,937	I $7,637	1.6
Expenses	363,524	413,976	D. 50,452	12.2
Net earnings	$118,050	$59,961	I. $58,089	96 8
Other income	16,573	25,550	D. 8,977	35.1
Total	$134,623	$85,511	I. $49,112	57.4
Charges	94,356	115,936	D. 31,580	18.6
Surplus	$40,267	$30,425*	I. $70,692	....

* Deficit.

Charges include interest, rentals and taxes. The balance sheet shows no considerable changes during the quarter.

Northern Adirondack Extension.—This company has been incorporated to build a railroad from St. Regis Falls, in Franklin County, N. Y., southward to Buck Mountain, a distance of 24 miles. It will be an extension of the Northern Adirondack road, running into the heart of the Adirondack country.

Northern Pacific.—It is reported that the committee of the board having the matter in charge have practically concluded an agreement for the sale of 240,000 acres of the company's lands in Dakota to a syndicate which made an offer some time ago. The lands include both farming and grazing lands, and the price is from $2 to $2.50 per acre. Payment will probably be made in preferred stock. The sale includes all the lands in Dakota so far surveyed and patented. The company has about 1,600,000 acres more, the surveys of which have not been completed.

Ohio & Northwestern.—This company has been organized to build a railroad from Gallipolis, O., eastward to Cincinnati, about 140 miles. A branch to Ironton is also proposed.

Ohio River.—Proposals are asked for the grading, masonry, bridging and trestle work for the extension of this road from Parkersburg, W. Va., to Point Pleasant, 79 miles. The work will be let in sections of from one to 10 miles. The most difficult work will be the masonry of the bridge over the Little Kanawha. Bids will be received until March 12 at the office of the Chief Engineer of the Ohio Valley Construction Co. at Parkersburg, W. Va., and profiles and specifications can be seen at that office.

Oregon Improvement Co.—This company's statement for December, the first month of its fiscal year, is as follows :

	1885.	1884.	Decrease.	P. c.
Earnings	$211,094	$228,192	$17,098	7.5
Expenses	181,622	184,494	2,872	1.6
Net earnings	$29,472	$43,698	$14,226	32.6

This statement covers the operations of the company in all departments.

Painesville & Youngstown.—It was expected that a final decree of foreclosure of mortgage on this road would be granted during the present week, and a date appointed for the sale of the property.

Paris & Great Northern.—Surveys are in progress for this projected line from Paris, Tex., northward to the Red River, and the company is also securing the right of way along the projected line.

Pennsylvania.—A branch of five miles in length is to be built from the Philadelphia & Erie Division at Wilcox in Elk County, Pa., to Burning Well. It will reach several large saw-mills. It will be built by a company known as the Wilcox Railroad Co., and will be leased by the Pennsylvania Railroad Co., which will also own the stock.

In view of the fact that many of the employés have shown a disinclination to accept the company's relief plan, General Manager Pugh will shortly hold a conference at which delegates from the various lines will be present. It is expected that the relief plan will be thoroughly discussed and, if possible, the objections to it removed.

This company's statement for January shows for that month as compared with January, 1885, on all lines east of Pittsburgh and Erie, an increase in gross earnings of $144,014; an increase in expenses of $183,047, and a decrease in net earnings of $39,033. These changes give the following statement :

	1886.	1885.	Inc. or Dec.	P. c.
Earnings	$3,421,536	$3,277,522	I. $144.014	4.4
Expenses	2,474,995	2,291,948	I. 183,047	8.0
Net earnings	$946.541	$985,574	D. $39,033	4.0
Per cent. of exps.	72.3	69.9	I. 2.4	...

All lines west of Pittsburgh and Erie show for the month a deficiency in meeting all liabilities of $129,707, being an increase in deficiency of $56,900, as compared with January of last year.

Pennsylvania, Poughkeepsie & New England.—The Court at Easton, Pa., has decided that the last sale of this unfinished road, which was purchased by Augustus Pindle, must be set aside and that all the proceedings under which the sale was ordered must be set aside. The road, on which no track has ever been laid, has been sold some 8 or 10 times, and has been known at various times as the South Mountain, the South Mountain & Boston, the Pennsylvania & New England, and by the name given above.

Philadelphia & Reading.—The Lockwood Committee of general mortgage bondholders has instructed its counsel to make application to the court for an order instructing the Receivers to stop the payment of interest on the floating debt, so far as the sum paid shall exceed the amount earned by the collaterals pledged.

Considerable excitement has been excited by the announcement that President Gowen has secured a large amount of money in aid of his plan, and that he purposes going on with his plan of reorganization regardless of any proceedings which may be taken by the Drexel syndicate. How much money Mr. Gowen has raised, or where he has secured it, he declines to make public. The only thing certainly known is that he has bought the Reading stock held by the Vanderbilt estate, which gives him a very large interest. The terms on which this stock was bought are not known. But it is announced that Mr. Gowen's plan does not include a foreclosure, and that his intention is that the stockholders shall retain their interests in the property. The announcement of this purchase, as might be expected, gave rise to all sorts of wild rumors, and the money at Mr. Gowen's command is variously stated at an amount anywhere from $10,000,000 to $30,000,000. These rumors rest on no certain knowledge, however, and all that is absolutely known is as stated above, that Mr. Gowen has bought the Vanderbilt stock and that he has raised some money. How much, he persistently declines to say.

St. Louis & Cairo.—President Charles Hamilton issues the following : "Having delivered the road and property of the St. Louis & Cairo Railroad Co. to the Mobile & Ohio Railroad Co., you will please make all reports, settlements and remittances for account of business of the St. Louis & Cairo Railroad, from and including Feb. 1, 1886, as may be directed by the Mobile & Ohio Co., reporting, as heretofore, on account of business prior to Feb. 1, 1886, to the St. Louis & Cairo Railroad Company."

St. Louis, Kansas City & Colorado.—The grading on this road is now reported substantially complete from St. Louis to Creve Cœur, a distance of 20 miles, and the rails for this section are now being delivered. On the 40 miles west of Creve Cœur about 1,000 men are now employed. The line is intended to run from St. Louis to Kansas City, and thence westward through Kansas.

Securities on the New York Stock Exchange.—The Governing Committee has this week put the following securities on the lists at the Stock Exchange :

Mexican Central, assented 4 per cent. mortgage bonds.

New York, Lake Erie & Western, $4,500,000 Long Dock Co. consolidated bonds, guaranteed by the Erie.

Oregon Short Line, $465,000 additional first-mortgage bonds and $2,765,000 additional stock.

Sioux City & Des Moines.—This company was recently organized to build a railroad from Sioux City, Ia., east by south to Des Moines, about 160 miles. Sioux City has voted $160,000 in aid of the project.

Southern Pacific Co.—The strike of the brakemen and freight handlers on the New Orleans end of this company's line has been finally settled by a compromise, which was arranged by an arbitration committee of the New Orleans Commercial Council. The brakemen will receive hereafter $60 a month, instead of $54, and the freight handlers will receive 30 cents an hour instead of 25, with 10 cents an hour extra for night and Sunday work. This is a substantial advance, although not as much as the men asked for.

South Pennsylvania.—The latest report is that Mr. F. B. Gowen has bought the interest of the Vanderbilt estate in this road, and that he is arranging with the Pittsburgh stockholders for a resumption of work on the road.

Stevens Point, Wausau & Northern.—This company has filed articles of incorporation in Wisconsin to build a railroad from Stevens Point on the Wisconsin Central road, to Wausau, and thence northward to the Michigan line, a distance of about 150 miles. The incorporators are all residents of La Crosse, Wis., and it is stated that their object is to open and develop a large lumber region.

Toledo, Ann Arbor & North Michigan.—The gross earnings for the year ending Dec. 31 are reported as follows:

	1885.	1885.	Increase.	P. c.
Southern Division	$259,887	$242,161	$17,726	7.3
Northern Division	39,630	11,420	28,210	247.4
Total	$299,517	$253,581	$45,936	18.1

The Northern Division is a detached line which has been partly under construction during the year.

Willmar & Sioux Falls.—This company has been organized to build a railroad from Willmar, Minn., southwest through Marshall and Pipestone to Sioux Falls, Dak., a distance of 150 miles. The company will ask for local aid from the counties along the line.

Wisconsin Central.—On the new line to Chicago track is now laid to Burlington, Wis., 55 miles southward from Schleisingerville. On the southern end the track has been laid from from the crossing of the Chicago Belt road northward 20 miles, making in all about 75 miles of track completed. About 10 miles more will be laid on the Chicago end, and the track-laying force will then be transferred to the northern end of the extension.

Zanesville & Newcomerstown.—This company has filed articles of incorporation to build a railroad from Zanesville, O., to Newcomerstown on the Pittsburgh, Cincinnati & St. Louis road, by way of Adamsville and Otsego. The distance is about 42 miles.

ANNUAL REPORTS.

The following is an index to the annual reports of railroad companies which have been reviewed in previous numbers of the current volume of the *Railroad Gazette:*

	Page.		Page.
Baltimore & Philadelphia	15	N. Y., N. Haven & Hartford	13
Boston & Lowell	15	N. Y., Ontario & Western	86
Boston & Maine	23	N. Y., Providence & Boston	25
Boston & Providence	15	N. Y. Railroad Commission	33
Buffalo, N. Y. & Philadelphia	16	N. Y., Susquehanna & Wes'rn	139
Cheshire	104	N. Y., West Shore & Buffalo	58
Cin., N. Orleans & Tex. Pacific	140	Norfolk & Western	104
Connecticut River	85	Norwich & Worcester	120
Consolidation Coal Co.	139	Northeastern (South Carolina)	16
Del., Lacka. & Western	104	Philadelphia & Reading	48
Denver & Rio Grande	139	Pittsburgh & Lake Erie	68
Fitchburg	88	Pittsburgh Junction	85
Huntingdon & Broad Top Mt.	120	Pitts., McK. & Youghiogheny	68
Lake Shore & Mich. So	23	Portland & Ogdensburg	120
Lehigh Coal & Navigation Co.	140	Providence & Worcester	120
Lehigh Valley	68	Richmond & Alleghany	86
Leh. & Wilkes-Barre Coal Co.	139	Richmond & Danville	85
Maine Central	68	Richmond, Fred. & Potomac	86
Michigan Central	13	Rochester & Pittsburgh	86
Mississippi & Tennessee	120	Rome, Wat. & Ogdensburg	85
Natchez, Jackson & Col.	104	Virginia Midland	139
Naugatuck	26	Western Maryland	139
New London Northern	120	Wilmington, Col. & Augusta	104
N. Y. & New England	16	Wilmington & Weldon	104

Charlotte, Columbia & Augusta.

This company owns a line from Charlotte, N. C., through Columbia, S. C., to Augusta, Ga., 191 miles. It leases the Atlantic, Tennessee & Ohio, from Charlotte to Statesville, 47 miles; the Chester & Lenoir (3 ft. gauge), from Chester, S. C. to Lenoir, N. C., 110 miles; and the Cheraw & Chester (3 ft. gauge), from Chester, S. C., to Lancaster, 29 miles; a total of 377 miles worked. The report is for the year ending Sept. 30.

The company is controlled by the Richmond & Danville through the Richmond & West Point Terminal Co., which holds a majority of the stock.

The general account is as follows, condensed:

Capital stock		$2,578,000
Funded debt		2,708,218
Bills, accounts and balances payable		234,774
Profit and loss		214,769
Total		$5,735,761
Road and equipment	$5,284,608	
Leased line extensions	144,204	
Stocks and bonds owned	135,329	
Materials and fuel on hand	80,104	
Accounts and balances receivable	39,916	
Cash on hand	51,600	
		5,735,761

The funded debt includes $218 old fractional bonds; $6,000 old Charlotte & South Carolina bonds; $189,500 Columbia & Augusta bonds; $2,000,000 Charlotte, Columbia & Augusta firsts and $500,000 seconds; $12,500 Chester & Lenoir bonds guaranteed. Stocks and bonds owned include $97,200 stock and $17,500 bonds of the company.

The earnings for the year were as follows :

	1884–85.	1883–84.	Inc. or Dec.	P.c.
Freight	$549,956	$492,907	I. $57,049	11.6
Passengers	216,462	222,209	D. 5,747	2.6
Mail, etc	60,549	54,147	I. 6,402	11.9
Total	$826,967	$769,263	I. $57,704	7.5
Expenses	462,957	571,475	D. 108,518	19.0
Net earnings	$364,010	$197,788	I. $166,222	84.0
Gross earn per mile	2,194	2,155	I. 39	1.8
Net " "	966	554	I. 412	74.4
Per cent. of exps	55.9	74.3	D. 18.4	....

Expenses include taxes, which amounted to $31,025 last year. The statement covers the entire mileage worked. The increase in net earnings was largely due to the great reduction in expenses.

The result of the year was as follows :

Net earnings, as above		$364,010
Interest, discount, etc	$206,501	
Rentals and interest, leased lines	58,123	
		264,624
Balance, surplus for the year		$99,386
Sundry accounts	$6,400	
Less old accounts, etc	1,674	
		4,726
Balance, Oct. 1, 1884		110,657
Balance, Sept. 30, 1885		$214,769

The surplus over interest and rentals last year was equal to 3.8 per cent. on the stock. In 1883–84 there was a deficit of $74,684 for the year.

The traffic reported for the year on all the lines was as follows :

	1884–85.	1883–84.	Inc. or Dec.	P.c.
Locomotive miles	699,896	656,517	I. 43,377	6.5
Freight car miles	3,635,728	3,380,472	I. 255,256	7.5
Passengers carried	216,887	218,461	D. 1,574	0.7
Tons freight carried	270,588	246,311	I. 24,277	10.0

Locomotive service cost 15.73 cents per mile run on the main line ; 14.73 on the Atlantic, Tennessee & Ohio; 10.02 on the Chester & Lenoir and 13.68 cents on the Cheraw & Chester.

The report says : "The general condition of the property has been fully maintained, and in some respects improved.

"Traffic has increased considerably, notwithstanding the trade depression which prevailed during the year, thus showing a large growth of business in our territory and a hopeful future for the road."

St. Paul & Duluth.

This company owns a main line from St. Paul, Minn., to Duluth, 150 miles, with branches to Taylor's Falls, 21 miles; Grantsburg, 17 miles, and Knife Falls, 6 miles. It leases, and practically owns also, branches to Stillwater, 13 miles, and to Minneapolis, 13 miles, making 225 miles worked. Of the main line 24 miles, from Thomson Junction to Duluth, are owned and used jointly with the Northern Pacific Co. There are 71 miles of sidings in all. The report is for the year ending Dec. 31.

The general account, condensed, is as follows :

Common stock and scrip		$4,055,408
Preferred stock and scrip		5,376,971
Funded debt		1,210,000
Accounts and balances		179,839
Deferred land income		368,669
Income account, balance		725,019
Total		$11,915,896
Road and equipment	$10,185,391	
Stocks and bonds	480,450	
Supplies	59,784	
Accounts and balances	469,792	
Cash	714,479	
		11,915,896

The funded debt consists of $1,000,000 first-mortgage 5s, and $210,000 Taylor's Falls Branch 6s. The company has unsold 69,560 acres Taylor's Falls Branch lands and 1,163,189 acres main line lands.

The earnings for the year were as follows :

	1885.	1884.	Inc. or Dec.	P. c.
Earnings	$1,381,212	$1,317,314	I. $63,898	4.9
Expenses	825,416	841,571	D. 6,155	0.7
Net earnings	$545,796	$475,743	I. $70,053	14 7
Gross earn. per mile	6,139	5,85[illegible]	I. 284	4.9
Net " "	2,426	2,114	I. 312	14.7
Per cent. of exps	60.5	63 9	D. 3.4	.. .

The earnings have shown a steady and continuous increase for several years past.

The income statement is as follows:

Net earnings of railroad, as above		$545,796
Income from land sales and stumpage		201,415
Total		$747,211
Interest paid	$50,000	
Improvements, construction and equipment	167,186	
Dividends on preferred stock, 7 per cent	374,531	
		591,717
Balance, surplus for the year		$155,494
Balance from previous year		235,353
Total surplus, Dec. 31, 1885		$390,847

The deferred income from land sales and stumpage amounted to $368,669 on Dec. 31. The surplus for the year shown above was equal to 3.83 per cent. on the common stock.

Prior to 1885 expenditures for improvement, construction

and equipment were charged to cost of property. Last year these expenditures, amounting to $167,186, as above, were deducted from income.

Extensive improvements were made at Duluth, and 16 miles of new sidings were built. Large additions to the equipment have been ordered, and will be delivered during the current year; the money to pay for these has been provided.

Delaware, Lackawanna & Western.

The brief statement which is the only report made by this company gives the following figures for the year ending Dec. 31 last.

The company owns 210 miles of railroad, and a great coal property in Pennsylvania. It leases 165 miles of railroad in New Jersey, and leases and controls 515 miles in New York, making 890 miles worked last year.

The general account was as follows on Dec. 31 :

Liabilities :

Capital stock		$26,200,000
Bonded debt		3,674,000
Surplus account, Dec. 31., 1885		11,307,899
Total liabilities		$41,181,899
Assets:		
Construction account, Dec. 31, 1884	$34,250 418	
Coal lands and improvements purchased since, etc	257,629	
		$34,508,047
Materials on hand		941,371
Stocks and bonds (cash market value, $6,464,995)		5,374,918
Accounts receivable as follows:		
Cash on hand	$680,231	
Coal on hand (less than market value)	766,135	
Advances to leased roads	1,027,746	
Advances on coal to be delivered, etc	976,342	
Coal bills and sundry accounts due	1,603,299	
Assets of N. Y., Lack. & W. Railway	767,700	
Loans and sundry accounts receivable	936,926	
	$6,758,379	
Less accounts payable, viz.:		
Past due dividends, interest and rentals	$146,912	
D., L. & W. dividend, payable Jan. 20, 1886	458,500	
Rentals payable after Jan. 1	1,710,546	
State taxes payable after Jan. 1	477,991	
December pay rolls, payable in January	487,708	
Bonds and mortgages	865,436	
Vouchers due and payable after Jan 1	739,394	
Sundry accounts payable after Jan. 1	831,563	
Sundry obligations, account of transportation	682,766	
	6,400,816	357,532
Total assets		$41,181,899

Of the accounts payable given above $3,286,655 have been paid off since the close of the year. The bonded debt was decreased $370,900 during the year by payment of maturing bonds.

The earnings and expenses for the year were as follows, the figures including receipts from coal and all other sources as well as from transportation :

	1885.	1884.	Inc. or Dec.	P.c.
Earnings	$31,091,677	$31,311.992	D. $220,315	0 7
Expenses	23,220,572	23,008 146	I. 212,426	0.9
Net earnings	$7,871,105	$8,303,846	D. $432,741	5.2
Per cent. of exps	74.7	73.5	I. 1.2	...

The coal transported last year was 6,711,634 tons, against 6,578,655 in 1884; an increase of 132,979 tons, or 2 per cent.

The disposition of net earnings was as follows :

Net earnings, as above		$7,871,105
Interest on bonds	$261,507	
Rentals of leased lines	4,925,582	
New equipment and tracks	443,182	
	5,630,271	
Balance, surplus for the year		$2,240,834

The leased lines on which rentals were paid are: Morris & Essex; Newark & Bloomfield; Passaic & Delaware; Chester; Warren; Valley, of New York; New York, Lackawanna & Western; Cayuga & Susquehanna; Oswego & Syracuse; Greene; Utica, Chenango & Susquehanna Valley.

The surplus as shown above was equal to 8.55 per cent. on the stock, against 10.70 in 1884. The dividends paid for 1885 were 7½ per cent., against 8 per cent. for the preceding year.

Northern Central.

This company owns a line from Baltimore north to Sunbury, Pa., 139 miles, with a branch from Relay House to Green Spring, Md., 9 miles. It leases the Shamokin Valley & Pottsville road, Sunbury, Pa., to Mt. Carmel, 28 miles; the Williamsport & Elmira, 78 miles; the Chemung, 22 miles, and the Elmira & Canandaigua, 47 miles, these three roads forming a line from Williamsport, Pa., to Canandaigua, N. Y., 147 miles. The total is 148 miles owned and 323 worked. Its trains use the Philadelphia & Erie track from Sunbury to Williamsport, 40 miles, and the Philadelphia & Erie trains use its track from Sunbury to Marysville, 47 miles. The report is for the year ending Dec. 31.

The company also owns the stock of the Union Railroad which connects its station at Baltimore with the wharves at Canton and the Philadelphia, Wilmington & Baltimore and the Baltimore & Potomac roads. It also controls the Sodus Bay & Southern road, from Stanley, N. Y., to Sodus Point, 34 miles.

The company is controlled by the Pennsylvania Railroad Co., its main line forming that company's connection with Baltimore.

The general account, condensed, is as follows :

Capital stock		$6,500,000
Funded debt		14,901,000
Mortgages and ground rents		440,354
Accounts and balances payable		1,217,628
Depreciation fund, coal lands		137,399
Profit and loss, balance		989,268
Total		$24,245,649
Road and equipment	$18,065.418	
Mortgages and ground rents	9,752	
Stocks of leased lines	2,500,000	
Other stocks and bonds	1,735,776	
Depreciation fund	191,512	
Materials on hand	289,123	
Accounts and balances receivable	508,276	
Cash	945,762	
	24,245,649	

The funded debt shows a reduction of $352,000; it consists of the Maryland state loan of $1,500,000 which bears 6 per cent. interest and is irredeemable; $1,126,000 mortgage 6s of 1890; $2,804,000 consolidated mortgage 6s; $4,438,000 consolidated general mortgage 6s; $1,220,000 consolidated general mortgage 4½s, and $3,813,000 second general mortgage 5s.

The company holds bonds of other roads having a total par value of $606,000, and stocks of a par value of $2,954,-616. The income from these securities last year was $167,138.

The assets of the insurance fund now amount to $178,509. The income last year was $50,464, the expenses $12,021, and there was $37,603 invested.

The earnings for the year were as follows:

	1885.	1884.	Inc. or Dec.	P.c.
Freight	$4,192,105	$4,181,442	I. $10 663	0.2
Passengers	869.120	932,848	D. 63,728	6.8
Mail and express	124,491	123,711	I. 780	0.6
Miscellaneous	305,206	283 876	I. 21,330	7.5
Total	$5,490,922	$5 521,877	D. $30,955	0.6
Expenses	3,255.614	3,468,393	D. 212,779	6 1
Net earnings	$2,235,308	$2,053,484	I. $181,824	8.9
Gross earn. per mile	17,000	17.096	D. 96	0.6
Net " " "	6 921	6,358	I. 563	8.9
Per cent. of exps	59.3	62.8	D. 3.5	...

The gross earnings per mile last year on the main line were $27,880; Green Spring Branch, $725; Shamokin Division, $15,080; Elmira Division, $9,963; Chemung Division, $5,769; Canandaigua Division, $6,017. Included in expenses are improvements costing $153,454 in all.

The result of the year was as follows :

Net earnings, as above		$2,235.308
Interest, dividends and hire of equipment		246.167
Pennsylvania R. R. Co., share of loss on leases		7 904
Total net income		$2,489,379
Rentals of leased lines	$448,464	
Interest on bonds	860.425	
Other interest, etc	118,227	
Dividends, 8 per cent	520.000	
	$1,947,116	
Balance, surplus for the year		$542,213
Profit and loss, balance, Dec. 31, 1884	$1,195,210	
Depreciation, etc. (less $68 credits)	748,155	
	447,055	
Profit and loss, balance, Dec 31, 1885		$989,268

The leased lines north of Williamsport show a net loss (after deducting contribution from the Pennsylvania Railroad Co.) of $7,904 for the year.

The large amount charged to depreciation is intended to bring the amount credited to the leased lines down nearly to their actual value. There was charged to profit and loss also $75,228 for interest and betterments on Sodus Bay & Southern road.

The company has exchanged the old Bolton depot property with the city of Baltimore for other property of equal value and more conveniently situated.

The traffic for the year was as follows :

	1885.	1884.	Inc. or Dec.	P.c.
Passengers carried	3,197,202	3,131,747	I. 65,455	2.1
Passenger-miles	37,324,977	39,009.765	D. 1.684,788	4 3
Tons freight carried	12.091,022	10.774.129	I. 1,316,893	12.2
Ton-miles	595,085,163	506,975,576	I. 88,109,587	17.4
Average rate :				
Per pass.-mile	2.329 cts.	2.391 cts.	D. 0.062 ct.	2.6
" " net	0.248 "	0.388 "	D. 0.140 "	36.1
Per ton-mile	0.704 "	0.825 "	D. 0 121 "	14.7
" " net	0.287 "	0.295 "	D. 0.008 "	2.7

The coal tonnage carried last year was: Anthracite, 3,201,-502; bituminous, 1,289,119; total, 4,490,621; increase, 733,-928 tons, or 19.5 per cent.

The earnings, expenses and profit per ton-mile on the several divisions of the road were, in cents:

	1885. Earn.	1885. Exps.	1885. Net.	1884. Earn.	1884. Exps.	1884. Net
Main line	0.768	0.432	0.336	0.870	0.545	0.325
Green Spring Branch	4 093	3.839	0.254	3.429	2 634	0.796
Shamokin Division	1.111	0 374	0.737	1.174	0.527	0.647
Elmira Division	0.514	0.361	0.153	0.646	0 473	0.173
Chemung Division	0.310	0.387	*0.077	0.468	0 424	0 044
Canandaigua Division	0.518	0.488	0.030	0.690	0.604	0.086
All lines	0.704	0.287	0.417	0.825	0.530	0.295

*Loss.

The rate per ton-mile last year on the Chemung Division, where the traffic is chiefly coal and through freight, was but little over *three mills per ton-mile*, and is the lowest ever reported.

The report gives at considerable length the proceedings in relation to the proposed purchase of the Beech Creek, Clearfield & Southwestern road, which have been noted from time to time.

The report says: "Of your 6 per cent. loan originally for $2,500,000, maturing July 1, 1885, there were outstanding at that date $1,490,000. The holders of these bonds, to the extent of $600,000, availed themselves of the privilege of exchanging the same at par for a new series of substitutional bonds secured by the consolidated general mortgage of 1874, maturing in 40 years from April 1, 1885, and bearing interest at 4½ per cent. per annum. The balance of the outstanding bonds, with the exception of a small amount not yet presented, have been paid, the funds for that purpose having been provided from current cash resources and from the sale of $620,000 of the bonds of the new issue, leaving $270,000 thereof on hand for the future uses of the company. The debt having been thus discharged, the assets held in the sinking fund on account of its payment, consisting of $541,-000 of the company's bonds and $32,502 cash, were turned over by the trustees to your company, and their account closed. * * * *

"The attention of your management has been directed for several years to the importance of the establishment of a relief fund for your employés, with the view of providing for their support in case of temporary disability from accident or sickness, and also for a contribution to their families in case of death. After earnest and prolonged consideration a plan was matured, which has been adopted by a number of your affiliated lines and has thoroughly commended itself to the judgment of your board. It is believed that it will be of material advantage, not only to the interests of your employés, but also to those of the shareholders."

Chicago & Alton.

At the close of the 23d fiscal year, Dec. 31 last, this company operated lines as follows :

	Main track.	Second tracks.	Side track.	All tracks.
Chicago to Joliet	37.20	39.80	27.53	104.53
Joliet to East St. Louis	243.50	22.46	70.94	336.90
Coal City Branch	29.76	...	9.56	39.32
Dwight to Washington and Lacon	79.80	...	7.20	87.00
Roodhouse to Louisiana	38.10	....	7.02	45.12
Bloomington to Wann, *via* Jacksonville, Godfrey and Upper Alton	158.00	.....	16 29	174.29
Louisiana & Missouri River	100.80	.....	16.93	117.73
Mexico to Kansas City	161.92	0.87	31.47	194 26
Total miles	849.08	63.13	186.94	1,099.15

The mileage of road was diminished 0.70 mile by the straightening of track between Mexico and Kansas City. There was an increase of 2.39 miles of sidings, and of 1.69 miles in the total of all tracks. The road worked is all owned by the company, except the Louisiana & Missouri River.

The equipment includes 228 locomotives; 119 passenger train cars and 19 Pullman sleepers; 3,213 box, 10 refrigerator, 1,360 flat and coal and 100 caboose cars; 16 tool and boarding cars.

The general account, condensed, is as follows :

Liabilities :

Common stock	$14.107,800
Preferred stock	3.479.500
Funded debt	12,499 850
Joliet & Chicago stock	1,5 0,000
Miss. River Bridge stock and bonds	675,000
Bonds redeemed and canceled	1,552 000
Louisiana & Mo. River bond account	439.100
Common stock unissued	3,700
Accounts and balances	1,253,427
Income account, balance	2,384,515
Total liabilities	$38,194,892

Assets :

Road and property	$31,810.122
Stock and bonds owned	3,733,366
Machinery and tools	312,644
Supplies on hand	281.356
Sundry accounts and trusts	119,762
Accounts and balances receivable	730.117
Cash on hand	1,207,525
Total assets	$38,194,892

There were 731 shares of common stock issued last year in exchange for an equal number of St. Louis, Jacksonville & Chicago shares, under the agreement of consolidation made in 1884. Only 37 shares of that company's stock remain outstanding.

During the year $82,000 of sinking fund gold 6s and $9,000 Mississippi River Bridge bonds were redeemed and canceled on account of the sinking funds.

The earnings for the year were as follows :

	1885.	1884.	Inc. or Dec.	P.c.
Freight	$5,432,633	$6,073,675	D. $641.042	10.5
Passengers	2,209.502	2,278.429	D. 68,927	3.0
Express	158,626	167,731	D. 9,105	5.5
Mails	137,200	137,931	D. 731	0.5
Miscellaneous	55,208	51,508	I. 3,700	7.1
Total	$7,993,169	$8,709.274	D. $716,105	8.2
Expenses	4,612,847	5,133,790	D. 520,943	10.1
Net earnings	$3,280 322	$3,575,484	D. $195,162	5.5
Gross earn. per m.	9,414	10,249	D. 835	8.1
Net earn. per m.	3,981	4,208	D. 227	5.4
P. c. of exps	57 7	58.9	D. 1.2	....

The decrease in earnings was chiefly due to decrease in traffic, as there was a small increase in freight rates, and also in passenger rates.

The result of the year was as follows :

Net earnings, as above		$3,280,322
Interest, dividends, etc, received		272,846
Total		$3,653,168
Interest on funded debt	$839.307	
Sinking fund bonds bought	93,854	
Rentals	704,473	
New construction and equipment	380,702	
Dividends, 8 per cent	1,409,750	
	3,428,086	
Balance, surplus for the year		$225,082
Balance, Jan. 1, 1885		2,159,433
Total balance, Dec. 31, 1885		$2,384,515

The principal expenditures for improvements were for improving alignment, ballasting track, real estate and completion of repair shops.

The traffic for the year was as follows :

	1885.	1884.	Inc. or Dec.	P.c.
Pass. car miles	9,763.232	10,090,439	D. 327.207	3.2
Freight car miles	70,725,909	75,429,963	D. 4,704,054	6.2
Passengers carried	1,721,286	1,907,486	D. 186,200	9.8
Passenger-miles	109,078,875	119,946,417	D. 10,867.542	9.1
Tons freight carried	3,631,108	3 598,284	I. 32,824	0.9
Ton-miles	538,522,498	602,768,054	D. 64,245,556	10.7
Average rate :				
Per passenger-mile	2.025 cts	1.900 cts.	I. 0.125 ct.	6.6
Per ton-mile	1.009 "	1.007 "	I. 0.002 "	0.2

Of the freight car mileage last year 70.7 per cent. was of loaded cars. The average tonnage of loaded cars was 10.77 tons; of all cars, 7.61 tons. The average freight haul was 148.31 miles. Of the tons carried through freight formed 24.5 per cent. Company's freight moved (not included above) was 367,003 tons.

Through passengers formed 7.4 per cent. of the whole number. The average rate per passenger-mile through was 1.773 cents; local, 2.203 cents. The average passenger journey was 63.37 miles, and the average train load was 64.05 passengers.

Foreign freight cars ran 20,789,443 miles on this road and Chicago & Alton cars ran 18,133,062 miles on foreign roads :

The President's report says: "The total gross earnings from farm products shipped at local stations were :

	In Illinois.	In Missouri.	In Illinois and Missouri.	Per ct. of freight traffic.	Per ct. of all traffic.
1881	$799,324	$301.662	$1,100,986	19.848	14.567
1882	768,813	397,424	1,166,237	19.606	14.195
1883	576,793	455,039	1,031,832	16.648	11.711
1884	528.615	340,656	869,271	14.312	9.981
1885	599.920	282,372	882,292	16 241	11 038

"The foregoing statement shows that only about 11 per cent. of the gross earnings of our lines during the past year was derived from the transportation of farm products shipped at local stations, and that only 16.241 per cent. of the freight earnings during the year was derived from that traffic. * * * *

"The replacement of iron rails with steel rails of 60 and 70 lbs. per yard on all main lines, including first, second, third and fourth main tracks, had been completed at the date of the last annual report. The company has now tracks with steel and with iron rails, as follows: Number of miles of main track on main lines laid with steel, 752.65; number of miles of main track on branch lines laid with steel, 94; number of miles of main track on branch lines laid with iron, 65.56; number of miles of side tracks laid with iron, 101.19; number of miles of side tracks laid with steel, 85.75; total, 1,099.15.

"There were 7,281 tons of new steel rails and 386,043 new cross-ties laid during the last year. Twelve spans of bridges have been replaced with iron during the last year. The aggregate length of all the wooden bridges now remaining on main lines is about 375 ft. There were 57 miles of road-bed ballasted with broken rock and 16 miles with cinders during the year. The length of ballasted road-bed on main lines at the close of the year was: With rock, 220.68 miles; with gravel, 178.90 miles; with cinders, 157.83 miles; total, 566.41 miles. Length of tracks on main lines unballasted, 151 miles. All necessary repairs and renewals have been made. The railroad and all its appurtenances have been maintained in good condition, and in many respects improved."